QUEENSLAND AGRICULTURAL JOURNAL

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Agriculture.

THE COTTON-GROWING INDUSTRY IN QUEENSLAND.

Now that cotton-growing by farmers in many parts of the State has, owing to the facilities afforded to them by the Government for the profitable sale of the product, begun to assume the importance which characterised the industry in past years, a few notes on the subject of conditions under which the crop can be produced in this State will doubtless be appreciated by intending growers. Those conditions are—An equable climate, not subject to sudden variations of temperature; a warm climate; and, in the case of Sea Island cotton, a moist, saline atmosphere such as is found on the Sea Islands of James, Edisto, Wadmalow, and John's, off the coast of South Carolina, U.S.A. The coast lands of Queensland, north of Rockhampton, with their tropical heat, with a considerable rainfall, and with a saline atmosphere, are therefore admirably adapted to the cultivation of this particular variety of long-stapled cotton. There, the temperature of air and soil are practically in accord and remain equable during the whole growing season.

On the other hand, the Uplands and Egyptian varieties of the plant find a congenial atmosphere in the southern and western districts of the State.

By many people it is believed that the cotton plant is a drought-resister, which will survive even protracted drought. We have certainly seen fine cotton plants in the western districts, 500 miles from the coast, which had grown luxuriantly throughout the protracted drought which terminated in 1902. For two or three years these plants had been unacquainted with visible water in any form but occasional dew; but it does not follow from this that cotton can be generally successfully produced in an arid wilderness. Long-continued dry weather unquestionably has an injurious effect on the crop, in that it checks the production and growth of the bolls, and is the cause of the fibre being too short to be of great value. On the other hand, should there be too much rain, the plants may run to wood, to the detriment of the fruit. A certain amount of rain or other moisture is required before the blossoming period. After the bolls have formed, dry, warm weather is needed, more especially when the bolls have burst. The effect of long exposure to rain after they have opened out, on the exposed cotton, is not injurious. We have seen cotton which had been for many days drenched with rain, but yet underwent no change in colour or lustre. As regards soil conditions, a cotton soil need not be of the richest description, but neither may it be deficient in the special plant food needed for this crop. Some of our richest soils, which now produce heavy crops of maize, sugar-cane, and potatoes,

yielded very indifferent cotton crops, whilst poorer soils, under exactly the same conditions, gave handsome returns amounting, in some cases, to over 2,000 lb. of seed cotton per acre. In choosing a soil for the purpose of cotton-growing, a sandy loam, not too rich in humus, should, as a rule, be preferred to a heavy rich, black soil; and heavy clay soils should be avoided, as they are more difficult and expensive to work (and cannot be worked at all during continuous rainy weather), and hold water to such an extent that growth is practically stopped. Such lands require an admixture of large quantities of lime and sand. Stagnant water is one of the worst enemies of the cotton plant. What is required to ensure a good crop is a free soil with good drainage, enabling the plants to obtain all the moisture they need, whilst, at the same time, the superfluous water drains away.

The cotton plant sends a long taproot into the ground, and it is this that enables it to thrive during continued dry weather, the taproot going deep down (from 16 to 24 in.) in search of the needed moisture.

In the West Moreton district, where more cotton has been grown in the past than in any other part of the State, the generality of the soils are eminently suitable for a cotton crop, and the same may be said of the light sandy loams of the central and western districts.

THE DWARF COCONUT.

The following note, extracted from an article on "The Dwarf Coconut" by Mr. W. P. Handover in the "Agricultural Bulletin of the Federated Malay States," No. 5, 1919, will doubtless be interesting to those of our readers in Papua, Queensland, and other British coconut-growing dependencies. In reference to this topic we recall that in 1885, a most exhaustive history of the Coconut Palm was published by the proprietors of the "Ceylon Observer," and issued under the title "All About the Coconut Palm." In this book, many varieties of the palm are mentioned, but the Dwarf Palm mentioned therein, is described as bearing a sort of Maldive or dwarf coconut, about the size of a duck's egg. However, that may be, the article alluded to reads as follows:—

"The dwarf coconut, known in this country as 'nyiur gading,' is remarkable for its early fruiting, palms only 10 ft. high bearing abundant fruits touching the ground. The young palm grown under good conditions starts to flower in its third year and produces ripe fruit in about nine months from the appearance of the flower spike. The initial flower spikes contain only male flowers, but other spikes appearing in rapid succession are larger and bear an increasing number of female flowers also, a spike from a six-year-old tree being counted with 200 young female flowers, whilst trusses of fruit from similar trees have been found with as many as fifty-five ripe nuts. It is generally of a bright yellow colour, and Winstedt, in his quotations from Malayan Folk Lore, speaks of 'nyiur gading,' the golden coconut only to be found in the Princes' Gardens.

"Five hundred nuts to a picul (133⅓ lb.) of copra is a general average yield. With the leaf length only 12 ft. it was found convenient to plant the palms 24 ft. by 20 ft., which gave ninety to the acre, a number nearly double to that required when planting big palms. In the fifth year the trees yielded thirty nuts apiece, so that 2,700 nuts would be obtained from trees planted ninety to the acre, while in the ninth year, which is the sixth yielding year, 120 nuts were yielded per tree in full bearing, making 10,800 nuts per acre or 21⅔ piculs (2,807 lb.) of copra per acre. The big coconut does not produce till after its fifth year, but in the ninth year forty-five trees per acre would probably yield forty nuts apiece or 1,800 nuts per acre, giving 8 piculs of copra per acre. The nuts of the dwarf trees can be easily and rapidly picked and also inspected for beetles and other pests. Almost two and a-half times the number of nuts per picul of copra have to be handled as compared with the larger nuts, but it is suggested that this may not be of great consequence when working with newly devised methods and machinery, dealing with large quantities."

[A good coconut tree should yield an average of 100 nuts per year, and in good seasons, 200 nuts have been obtained, but the average in some of the West Indian Islands is about 65 nuts per tree. Coconut Palms will continue to bear for seventy or eighty years. The low average is due, doubtless, to want of care and attention on the part of the planter. In 1908, the average return per tree in Papua was given by Mr. N. R. Schroder, in an article contributed to "Dalgety's Review," at the low estimate of 60 nuts per tree, and during the first six years, little or no returns were to be expected.—ED. Q.A.J.]

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The Office of the Secretary of the undermentioned Herd Book Societies is 303 Queen street, Brisbane:—

The Australian Hereford Herd Book;
The Shorthorn Herd Book of Queensland;
The Jersey Herd Book of Queensland;
The Illawarra Herd Book of Queensland;
The Ayrshire Herd Book of Queensland;
The Milking Shorthorn Herd Book of Queensland;
The Holstein-Friesian Herd Book of Australia.

NOTE.—Animals registered in the Commonwealth Standard Herd Book are not necessarily eligible for entry in the Jersey Herd Book of Queensland.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
	DAIRY BREEDS.			
	AYRSHIRES.			
W. C. Smith	The Haven, Goomeri	1	7	Ayrshire Society of Queensland
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
J. H. Paten	Gwandalan, Yandina	6	21	Do.
Queensland Agricultural College	Gatton	4	10	Do.
State Farm	Warren	3	83	Do.
J. W. Paten	Ayrshire Park, Wanora, Ipswich	10	42	Do.
J. H. Fairfax	Marinya, Cambooya	9	55	Do.
J. Holmes	"Longlands," Pittsworth	6	20	Do.
H. M. Hart	Glen Heath, Yalangur	7	21	Do.
F. A. Stimpson ..	Ayrshire Stud, Fairfield, South Brisbane	7	77	Do.
M. L. Cochrane ..	Paringa Farm, near Cairns	5	21	Do.
John Anderson ..	"Fairview,' Southbrook	7	34	Do.
	JERSEYS.			
T. Mullen	"Norwood," Chelmer	3	20	Jersey Herd Book of Queensland
Queensland Agricultural College	Gatton	2	31	Do.
M. W. Doyle	"Oaklands," Moggill	4	12	Do.
G. A. Buss	Bundaberg	1	15	Do.
R. Conochie	Brooklands, Tingoora	9	21	Do.
W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Do.
W. J. Affleck	Grasmere, N. Pine ..	6	31	Do.
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Do.
W. J. H. Austin ..	Hadleigh Jersey Herd, Boonah	2	11	Do.
State Farm, Kairi ..	Kairi, *vid* Cairns ..	4	16	Do.
H. D. B. Cox	Sydney (entered in brother's name)	3	16	Commonwealth Standard Jersey Herd Book
	GUERNSEYS.			
Queensland Agricultural College	Gatton	2	2	Eligible, but no branch of the Guernsey Herd Book Society of Australia in Queensland

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS—*continued.*				
HOLSTEINS.				
Queensland Agricultural College	Gatton	2	9	Holstein-Friesian Herd Book of Australia
George Newman ..	"St. Athan," Wyreema	9	92	Do.
F. G. C. Gratton ..	"Fowlerton," Kingsthorpe	1	15	Do.
R. S. Alexander ..	Glenlomond Farm, Coolumboola	1	3	Do.
Ditto	Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings ..	St. Gwithian, Toogooloowah	..	..	Holstein-Friesian Herd Book of Australia
C. Behrendorff ..	Inavale Stud Farm, Bunjgurgen, Q.	3	9	Do.
E. Swayne	West Plane Creek, Mackay	1	2	Do.
ILLAWARRA.				
A. Pickels	Blacklands Stud, Wondai	4	62	Illawarra Herd Book of Queensland
J. T. Perrett and Son	Corndale, Coolabunia	3	43	Do.
W. T. Savage	Ramsay	2	22	Do.
Hunt Bros.	Springdale, Maleny ..	3	62	Do.
MILKING SHORTHORNS.				
P. Young	Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Do.
A. Rodgers	Torran's Vale, Lanefield	1	9	Do.
W. Middleton	Devon Court, Crow's Nest	3	27	Do.
A. K. Yorksten ..	"Dunure," Miles ..	2	8	Do.
W. H. Francis ..	"Exelawn," Colinton, Brisbane Valley Line	3	5	Do.
BEEF BREEDS.				
SHORTHORNS.				
T. B. Murray-Prior ..	Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
C. E. McDougall ..	Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
Godfrey Morgan ..	"Arubial," Condamine	3	6	Do.
W. B. Slade	E. Glengallan, Warwick	2	20	Do.
HEREFORD.				
A. J. McConnell ..	Dugandan, Boonah	19	36	Australian Hereford Herd Book
E. M. Lumley Hill ..	Bellevue House, Bellevue	45	127	Do.
Tindal and Son ..	Gunyan, Inglewood	50	400	Do.
SUSSEX.				
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book of England

RECORD LAMBING.

Mr. J. Buchanan, a farmer at Glen Lamington, who owns a small flock of sheep, informs us that one of his ewes had four lambs at last lambing—a case very unusual. Twins in his flock are common. Last year one of the ewes had triplets, and he believes it to be the same one which this year had four. All of this progeny are males. Mr. Buchanan would like to hear of any other owner of a small flock who has had a similar experience.

With reference to the above, Mr. W. G. Brown, Instructor in Sheep and Wool, Department of Agriculture and Stock, says:—

"This is another instance of the fecundity of the Border Leicester breed. It is the first instance of quadruplets which has come under my notice in connection with any breed. I have seen numerous cases of triplets in this breed, notably on Logie Plains, Mr. Geo. Hartnoll owner; and twins are very common. They are also very good mothers, and invariably give a big supply of milk to their lambs."

SOME CHAMPION AMERICAN DAIRY COWS.

The American champion cow "Tilly Alcatra" is the world's record holder with 33,424 lb. of milk in 365 days. Her records for five years, as published in the American official journal of the Friesian Club, are:—

Age.	Days in Milk.	Milk.	Butter.
		lb.	lb.
2y. 6m.	285	14,837.2	556.20
3y. 6m.	365	24,421.3	
5y. 1m.	365	30,451.4	
6y. 5m.	365	29,826.6	
7y. 7m.	365	26,814.6	
9y. 3m.	365	33,424.8	
10y. 6m.	305	23,684.1	
For 7 periods		180,460.2	

SISAL HEMP.

Lately the Agricultural Department has received several inquiries as to the cultivation of sisal hemp from some who wish to give it a trial. During the war Mexican and East African sisal were worth over £100 per ton. Of late, however, we hear from all parts of the world, where the fibre is grown, that this commodity is in much the same position as Manila hemp in the Philippines. Messrs. Landauer and Co., London, in their monthly hemp and fibre report for September, 1920, write: "It is reported that workmen in Yucatan (Mexico) can no longer exist on the old wages. Work on the plantations is ceasing, as hemp can only be produced at a loss under present conditions. Unless prices improve, the inevitable result will be a considerable reduction in yearly production. Meanwhile, Mexican sisal is not being bought by consumers in Europe, and unless American mills are prepared to pay an adequate price they are likely to run short of material for next binder twine season."

The present prices for East African sisal are from £42 to £54 (for prime) per ton. Java sisal has sold at from £58 to £63 per ton, while Mauritius is unobtainable.

There can be no doubt that if it will not pay to grow and produce sisal in black and coloured-labour countries, where wages, as a rule, are very low, it will never pay in our British tropical countries, where white labour alone is employed. In 1912 the cost of growing and producing the fibre amounted to about £12 per ton, whilst the fibre sold readily at £25 to £30 per ton. But to-day wages and cost of machining and freights have so risen that we consider it inadvisable to start sisal growing again in this State.

The Horse.

BITTING AND BREAKING HORSES.

One of the most serviceable bits for general use is the Liverpool bit, but whatever the pattern may be, it should be properly fitted to the mouth. A severe bit not only punishes the horse, but hardens the mouth. Some bits, often those worn by show horses, possess ports deep enough to half choke the wearer, and as often as not the horse would go better without the latter addition were a thick, straight bit, either of steel or indiarubber, in his mouth instead of the massive arrangement which is torture to him. There are, of course, naturally defective mouths and mouths which have been spoiled by bad breaking, and there are likewise horses which from some cause or other require special bitting. In such cases exceptional treatment is necessary, and perhaps the best bit of all to control a trotter is one of the pattern known as the Mowhawk. A tight curb chain is a constant source of unnecessary pain, and some chains are far too narrow, cutting into the flesh and causing the animal to fidget and throw his head back. It is a fact that more horses are injured by having an inappropriate bit forced into their mouths than by any other cause. If those concerned would only pause to give themselves time to remember that the mouths of horses differ very considerably from one another there would be fewer accidents.

The education of the horse should be like that of the child. Pleasure should be as much as possible associated with the early lessons, while firmness, or, if need be, coercion, must establish the habit of obedience. It is surprising how soon, under a system of kind management, the animal which has been accustomed to go where he pleased and to do what he thought fit may be taught to yield up his will to another and to obey with alacrity his master's bidding. If there is a kind-hearted servant about your premises who is capable of undertaking the task, he will be more likely to succeed than the average colt-breaker, who seldom has any conception of attaining his object by the moral influence which kindness would give him over the youngster. A horse is well broken when he has been taught implicit obedience to his rider or driver and dexterity in the performance of his work. A dogged, sullen, and spiritless submission may be enforced by the cruel and brutal usage to which the breaker so often has recourse, but that prompt and eager response to the slightest intimation of the rider's will, the manifest aim to anticipate every wish, which gives to the horse so much of his value must be founded on habitual confidence and attachment.

Imperfect vision is responsible for many a horse bolting and shying. The latter vice is more frequently the result of a high-spirited animal being ruined by an injudicious coachman. Nothing, however, will cure a horse of imperfect vision of the habit of bolting. No bit will stop him when he once makes up his mind to go away. Such a combination as a net and Mowhawk bit have been proved to be useless when the animal is once scared. The difficulty is that in many cases there is nothing about the eyes to arouse suspicion, and even practitioners often fail to detect anything wrong with the sight. Cribbing and wind-sucking are vices which one horse can impart to another, and animals which possess them should not be allowed to remain an hour longer in any owner's stable than is absolutely necessary. Jibbing is a terrible accomplishment for any horse to possess, and the man who can devise an infallible cure for it would deserve a great reward. Some have succeeded in making a jibber move by having a piece of rope dragged backwards and forwards on the inside of his forelegs behind his knees, not sufficiently hard to injure the skin, but hard enough to make him feel it.—"Live Stock Journal," London.

Dairying.

DO WE OVERFEED MILK?

A correspondent of the "Live Stock Journal," London, writes on this subject:—

Should a pig be allowed to eat all it wants is a question more easily asked, perhaps, than answered. Something depends on the purpose for which it is kept. It is rather significant that when judged by feeding standards which have been found on the average to be adequate, if not ample, for pigs in feeding trials, and which have been most carefully drawn up, every-day feeding will often be found to exceed them. There is no doubt at all that this is partly due to the latter being badly put together, which is a fruitful cause of waste, and appetites vary; but some of the overfeeding is due, perhaps, to the lavish use of milk, failing to recognise that milk solids are worth nearly two of meal, even when the fat has been removed.

For example, in the following rations, which seem popular for pigs of, say, 150 to 200 lb. respectively, the milk would seem to be reckoned as little more than a vehicle for the meal, for the dry matter which the latter supply is equal to the live-weight feeding standard mentioned above, and recognised as sufficient:—

	(1) Pigs 150 lb.			(2) Pigs 200 lb.	
		Meal equivalent.	Dry matter.		Meal equivalent.
	lb.	lb.	lb.	lb.	lb.
Barley meal	4	4	3½	6	6
Potatoes	3	0¾	0¾		
Separated milk	10	1⅜	0¾	10	1⅜
		6½	5		7
Amount of d.m. required for our feeding standards		4½-5	—	—	5½

(1) Was recommended before the Farmers' Club in 1911 as a paying ration in common use for pigs of 80 lb. to bacon size, and putting on 15 lb. weekly.

If this is so, it only shows that it pays to feed somewhat higher than standards prescribe. (We note the Danish are considerably higher, and they know a few things about pigs.) Or would it pay better still not to exceed them? But these limits in live weight are too wide, and 15 lb. increase is unusual.

With store stock the standards are probably ample, according to the requirements and the exigencies of the bacon trade, and the wise course appears to be to keep on a correctly blended foundation ration, and raise or lower the total (and incidentally the nutritive values) according as rough stuff has to be consumed, and probably not give full rein to their appetites; but with fatteners, so long as the food is digested, the old rule of giving as much as they will eat up seems to be a sound one on the various grounds on which early maturity and rapid fattening are so much to be commended. And healthy pigs generally have good digestions.

Let us compare the above with what has been stated to be a likely ration for a pig of 60-120 lb. live weight (*i.e.*, "class 3") in Denmark:—

		Meal equivalent.	Amount of d.m. required by our feeding standards.
	lb.	lb.	lb.
Skim milk	6	1	
Barley meal	4½	4½	
Boiled potatoes ..	2	0½	
		6	3½-4

It will be seen that the practical example (1) quoted above and the Danish nearly agree, but the pigs are not equal in weight, and it is significant that the milk is only half the English allowance, as in Denmark they only feed milk in about half the proportion of whey. Do we waste milk by over-generous proportions and quantities? That is the point.

But the difference between our feeding standards (dry matter) and the examples given is not so great as appears at first sight, as pig meals contain a considerable percentage of moisture, and, as dry matter (bulk), milk ranks no higher than meal, for a certain bulk of food is laid down by feeding standards for pigs as it is for cows, without which they would hardly feel satisfied. And, indeed, it is not possible with ordinary foods to reach the high standard of digestibility required by these standards without the use of milk for young pigs in considerable quantity.

But when these standards are exceeded, or when for older pigs milk is freely used where it has not the same value as for younger pigs, the matter is rather different, and it is easy, it would seem, to use milk wastefully. Perhaps the Danes realise this better than we do. The point is of more significance, perhaps, than at first appears, because it seems fairly clear from experiments that the proportion in which milk is mixed is of significance, and that the nearer this approaches the dry food in weight the more valuable it is. And the Danes would seem to have hit upon the best proportions (as their food values have been severely tested), which amount to from 12 to 30 per cent. food value of the total ration, which, already large, is thus further improved as compared to our more liquid one. Should we get better value if we gave less milk, and so lowered the albuminoid ratio and very high digestibility of our feeding standards, to that approved of in Denmark?

And the Leeds and Cockle Park experiments show us that this can be done satisfactorily (and with little pigs) by the use of peas or gram, without even using milk, as it often is in practice, especially with the somewhat indigestible fish meal, and, moreover, with amounts of food under rather than over standard.

DEHORNING COWS.

We have published in many previous volumes of this journal articles dealing exhaustively with this subject, and the following article, which we take from "The New Zealand Farmer," bears out practically everything which we have written on dehorning dairy cattle, and in all cases it has been recommended to perform the operation, a painless one, on young dairy stock before the horns have passed the bud stage. The wonder is that the advice so frequently given is generally disregarded, notwithstanding proof positive of its value:—

"A practical dairy farmer, except he is a faddist, will not dispute the contention that a dehorned herd of dairy cows is more profitable than one of similar milking capacity which is not dehorned.

"Generally speaking, the milk cow is a timid animal, and when the individual member of the herd is living in continual fear of injury from the horns of other members, she will certainly not yield so much milk as she would if living under more peaceful circumstances. Further, the danger of serious injury to a valuable cow is always present when the herd is not dehorned. It is also well worth noting that every improvement of this kind is the means of lessening the dairy farmer's worries, and he will always find plenty of unavoidable worries, even in the absence of those which are preventible.

"Dehorning the mature cow is neither a serious nor difficult operation, although it is infinitely better to carry out the operation in the calf stage. A good, strong dehorning bail is essential, also a dehorning instrument, which is much quicker than the saw. The work may be carried out at any time of the season, but the writer prefers cold weather to hot. The horn should be cut as close to the head as possible, the instrument being held in a sloping position instead of a horizontal one.

"In a few months after the operation a properly dehorned cow will look as if she had been born so. The absence of dehorning also causes enormous yearly loss among fat stock when being shipped to the butcher or freezing works. Not only are hides very often seriously injured, but many of the carcasses are badly disfigured, some so badly that they have to be condemned and boiled down. Only those who have spent several months on active duty in a freezing works can sufficiently realise the extent of the damage caused by horned fat stock.

"In the writer's opinion, dehorning, at least of dairy stock, should be compulsory. No argument in favour of retaining the horn has ever been advanced that could be used in the interest of economy, and we have reached a time when matters of this kind should be viewed from a common sense, practical standpoint. It is admitted that a certain shape of horn appeals to the breeder, but, after all, is not such a taste merely a child of custom? In the writer's opinion, the larger breeds look better without horns than with them. At best, horns are merely a relic of barbarism, and should have no place in domesticated life.

"The calf stage is the proper time for dehorning dairy stock, and it is then a simple and painless operation.

Although the writer has previously described the process, it may be permissible to again refer to it for the benefit of the inexperienced. Calf dehorning, to be effective, should be done when the calf is from two to five days old—not later—and all that is required for the operation is a stick of caustic potash. To prevent injury to the fingers the stick should be wrapped in strong brown paper when in use, and when not in use the caustic potash should be kept in a tightly-corked bottle.

"The operator should have someone to hold the head of the calf firmly. First clip the hair from around the base of the horn bud, then slightly moisten the stick of potash and apply it firmly to the top of the horn, rubbing with a circular movement for about half a minute, then make a brief pause and repeat the rubbing. If the work is carefully carried out at the proper stage no vestige of a horn will ever appear, but it must not be delayed until the horn bud becomes hard. Care must be taken when moistening the stick of potash, because, if too much moisture is used, there is danger of it dropping into the eyes of the calf and causing permanent injury. Of course, it should not be necessary to advise the operator against wetting the stick with his tongue—it will only occur once if he does.

"Ear-marking and tattooing should be done at the same time, and all particulars carefully entered in a herd book. Tattooing, if the particulars are carefully booked, absolutely prevents mistakes being made as to the identity of the calf, which is a matter of the utmost importance, even in a non-pedigree herd.

"The udders of heifer calves should be examined, and superfluous teats, if any, cut off. The appearance of a good cow's udder is often spoiled by neglecting this simple operation in the calf stage."

MILCH GOATS.

By W. C. CARMODY.

Much has been written on the above subject regarding housing, feeding, &c., but all is not applicable to Australia and Australian conditions.

That the goat is a wonderful animal there is no denying. If fed and handled intelligently, the nannies will produce three times as much milk as they would if allowed to forage for themselves.

To get good results, prime lucerne chaff, bran, and linseed meal are required. A standard ration is 2½ lb. lucerne chaff, 2 double handfuls bran, 1 handful linseed meal (once a day, or half a handful twice a day). The above is sufficient for one feed, but where goats are not allowed to forage, the same ration twice a day is required, preferably in the morning and at night, at milking time. They are very fond of bread, and will eat it at any time. Sweet potatoes are also useful, to add variety to the standard feed.

Grain, particularly maize, is too heating, and will dry them off if persisted in. The writer found that occasionally a tablespoonful of oats, mixed through the chaff did no harm, and gave variety, and nanny likes to search for the grains. Clean drinking water must be accessible at all times.

Goat's milk is particularly valuable for infants and invalids, because, owing to the smallness of the butter fat particles, it is easily assimilated by the weakest stomach, and there is no need to boil or scald the milk, as goats do not suffer from tuberculosis. Goat's milk is equal to mother's milk in regard to size of butter fat particles, and this explains the reason of its being so suitable for infants. The ass equals the goat in this respect, but the lactation period of the former animal is only two months, whereas the much despised nanny will milk profitably for 18 months, if kept from the buck. Goat's milk contains from 5 to 8 per cent. of butter fat, ass's milk 2 per cent., and as both goat's and ass's milk is most suitable for infants, it is clearly demonstrated that it is not the percentage of butter fat that counts, but

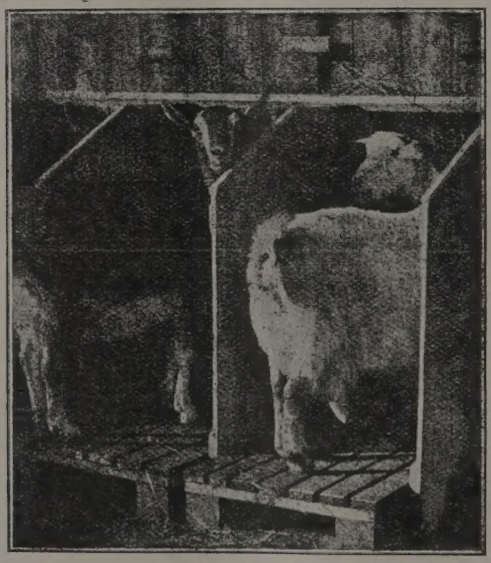
the fineness of the butter fat particles. The Angora is not a good milker, and therefore there is no choice but to get selected animals of the common breed. In selecting milkers, it is advisable to see them milked; and when this is done, the udder should be soft and yielding, and much reduced in size. The bag should show well up the escutcheon when distended.

There are two breeds of Swiss goats which are famous, viz., the Saanden and the Toggenburg.

Nubia also produces a famous milker, known as the Nubian. The Nubian is the Jersey among goats, and the Saanden the Holstein, in comparison with milch cattle.

The Saanden has the highest yield, a goat of this class being officially credited in England with a yield of 5 quarts some ounces per day, after being in milk five months.

The Commonwealth quarantine restrictions prohibit the introduction of animals from the Continent by individuals, but the Government of any State of the Commonwealth can introduce domesticated animals from any part of the world. (*Vide Commonwealth Gazette*, No. 48, of the 17th June, 1911).



Under this section the New South Wales Government introduced some Saanden goats from Switzerland in 1915 about.

The New South Wales Government will sell bucks of this breed for £10 10s. each (the supply would be limited), but no does are for sale. I understand that up to one gallon per day has been given by the does which are owned by New South Wales.

The milch goat question is an important one, and is deserving of serious attention, with the object of producing a goat that will give, say, a gallon of milk per day or over if possible.

The writer experimented with the common breed, and got a return of two quarts a day when fresh, and fed on the lines indicated, and 1½ quarts per day from a goat that had been in milk 16 months.

[Seeing that milch goats yield so much wholesome milk for so many consecutive weeks and months, and that they can be so cheaply fed, it is strange that suburban dwellers have not made a trial of this source of milk. They would thus have no trouble about watered milk, nor of a rise in price in drought times. The first cost is very small, and any little outhouse with a light roof will accommodate the animal, whilst the goat will thrive where a cow would starve.—ED. Q.A.J.]

SPECIFICATION FOR LAYING THE FLOOR OF COWBAILS WITH PORTLAND CEMENT CONCRETE.

Numerous inquiries having been made by our correspondents, especially by those engaged in the dairying industry, desirous of laying a permanent flooring in the milking-sheds, we publish *pro bono publico*, the following instructions kindly supplied to us by Mr. A. Morry, surveyor and engineer of the Department of Agriculture and Stock.

The ground to be carefully excavated to a regular surface with a fall of not more than 3 in. from the front of the bails to the back; any inequalities to be filled up with hard materials and well rammed with a wood or iron rammer.

Before starting to lay the concrete, fix wood screeds at top and bottom of the shed, the bottom screed to be 3 in. lower than the top one; these screeds to be fixed 4 in. above the ground line so that when the concrete is laid, rammed, and ruled off it will be of a regular thickness of 4 in. throughout. For ruling off, use a long straight-edge with bottom edge shot perfectly true with the plane.

Concrete to be composed of approved Portland cement in the proportion of 1 cask or 3 bags to 1 cubic yard of clean river or creek gravel, with all stones more than 1 in. in size taken out; or, failing gravel, 4 parts of broken stone which will pass through 1¼-inch mesh and 2 parts sand to 1 part of cement. This makes a concrete technically known as 4—2—1; but it must be understood that 1 cubic yard or 27 ft. cube of dry materials will not make 1 cubic yard of finished concrete, because the finer materials such as sand and cement go to fill up the spaces left in the larger material such as stone. The shrinkage in finished concrete, when rammed, is from 23 to 27 per cent. of the dry materials, so that about 31 ft. of gravel and cement is required for 1 yard cube of finished concrete.

The most convenient method of measurement is to make a box 3 ft. x 3 ft. x 1 ft. without top or bottom. Fill it with gravel or stones and sand, and add 1 bag of cement. This will give a good mixture. Turn it over twice dry, and twice when wet; then place it in position 4 in. in thickness between the screeds, level off with the straight-edge and well ram until the water comes to the surface; take care that no holes are left on the surface in which the water can lodge. Do not lay on a coat of cement for finishing, as this very often comes off after a time, but endeavour to get a good face with the rammer. If this is not satisfactory, make a grout of water with equal parts of sand and cement, stir up well until it is quite thick—too thick to flow. Pour this out on to the floor and brush it over with a stiff broom, taking care not to leave any lumps or inequalities. This will make a good and durable floor.

The open drain should be made with the same material, with 6 in. x 2 in. curb of hardwood on each side, and it is better finished with the trowel for a smooth face.

One cubic yard of concrete or 27 cubic ft. will be sufficient for every 8 superficial yards of floor 4 in. thick. This will require 3 bags of cement and 31 cube feet of dry materials for each cube yard.

A WONDERFUL INSTRUMENT.

An instrument that can detect the presence of a man 200 yards away merely by the heat his body radiates seems incredible, but that is only because most of our natural senses are so dull compared with the artificial senses devised by science, says "Everyday Science."

Such an instrument was perfected just before the end of the war, and would probably have been used if the fighting had lasted another winter. It consists of a thermopile, or very sensitive thermometer, set in the focus of a concave mirror, together with a galvanometer. The heat radiations of any object warmer than the surrounding atmosphere, where focussed by the mirror, act on the thermopile and cause deflections of the galvanometer. In actual tests on cold nights the instrument recorded the heat rays from the body of a man 600 ft. away, and a man lying in a shell-hole 400 ft. away was detected as soon as he lifted his head above the ground level. No man could cross the range of the instrument without his presence being indicated. The instrument was to have been used for watching "No-man's-land" on winter nights and giving warning of raids.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, OCTOBER, 1920.

In spite of the excessive heat and the storms which prevailed during the month, the laying was very satisfactory, especially in the light breeds. Broodiness has been rather troublesome in the heavy section, and eight Leghorns from the 102 in the light breed groups were broody also. In the singles, four birds laid the possible 31 eggs, two 30 eggs, eleven 29 eggs, and twelve 28 eggs. N. A. Singer's pen laid the highest total for the month in the light section, with 168 eggs. A Shank's and E. F. Dennis's Black Orpingtons in the heavy section each laid 157 eggs. The best laying in the groups was done by the pen owned by Mrs. R. Hodge, with 163, an average of just over 27 eggs per bird. There was one death during the month, Mr. L. G. Innes losing his "A" hen from ovarian disorder. The health of the birds is now good. The following are the individual records:—

Competitors.	Breed.	Oct.	Total.
	LIGHT BREEDS.		
*G. Trapp	White Leghorns ...	155	909
*Haden Poultry Farm	Do.	154	904
*O. W. J. Whitman	Do.	153	899
*J. M. Manson	Do.	156	866
Geo. Lawson	Do.	125	865
*J. J. Davies	Do.	146	861
*J. Newton	Do.	149	861
*Quinn's Post Poultry Farm	Do.	155	856
*W. Becker	Do.	148	833
*Dr. E. C. Jennings	Do.	153	832
*S. McPherson	Do.	121	823
*W. and G. W. Hindes	Do.	147	819
*N. A. Singer	Do.	168	815
*J. H. Jones	Do.	141	809
*H. Fraser	Do.	140	803
*G. Williams	Do.	141	803
*L. G. Innes	Do.	153	803
*E. A. Smith	Do.	147	798
Mrs. R. Hodge	Do.	163	794
*T. Fanning	Do.	125	794
*Mrs. L. Anderson	Do.	144	778
S. L. Grenier	Do.	129	769

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Oct.	Total.
LIGHT BREEDS—*continued.*			
Thos. Eyre	White Leghorns ...	128	766
*B. Chester	Do.	150	763
*S. W. Rooney	Do.	130	755
*Range Poultry Farm	Do.	137	754
*Mrs. Henderson	Do.	145	745
*Thos. Taylor	Do.	146	738
W. Morrissey	Do.	128	727
Avondale Poultry Farm	Do.	141	719
E. Chester	Do.	141	715
H. P. Clarke	Do.	131	696
R. C. J. Turner	Do.	129	682
C. Langbecker	Do.	119	673
C. M. Pickering	Do.	117	660
C. H. Towers	Do.	131	656
A. J. Andersen	Do.	87	653
S. Chapman	Do.	122	638
W. D. Evans	Do.	135	620
H. A. Mason	Do.	138	620
C. A. Goos	Do.	139	578
HEAVY BREEDS.			
*R. Holmes	Black Orpingtons ...	132	909
*E. F. Dennis	Do.	157	902
*R. Burns	Do.	137	879
*D. Fulton	Do.	122	878
*A. Shanks	Do.	157	877
*A. Gaydon	Do.	135	842
*E. Morris	Do.	124	841
H. M. Chaille	Do.	133	840
*W. Smith	Do.	122	809
*A. E. Walters	Do.	113	808
J. E. Smith	Do.	126	767
*E. Oakes	Do.	108	759
*J. Cornwell	Do.	150	759
*T. Hindley	Do.	121	754
*R. B. Sparrow	Do.	124	736
G. Muir	Do.	127	733
Mrs. G. H. Kettle...	Do.	136	723
Parisian Poultry Farm	Do.	129	730
R. C. Cole	Do.	118	706
*J. E. Ferguson	Chinese Langshans ...	126	681
*Nobby Poultry Farm	Black Orpingtons ...	108	667
*E. Stephenson	Do.	124	660
Miss E. M. Ellis	Do.	Withdrawn	583
G. Flugge	Do.	133	543
Total	...	8,669	49,838

* Indicates that the pen is being single tested.

DETAILS OF SINGLE HEN PENS.

Competitors.	A.	B.	C	D.	E.	F.	Total.
LIGHT BREEDS.							
G. Trapp	162	145	157	151	157	137	909
Haden Poultry Farm	175	126	167	157	136	143	904
O. W. J. Whitman	139	141	161	147	150	161	899
J. M. Manson	148	148	158	141	127	144	866
J. J. Davies	150	143	142	160	140	126	861
J. Newton	168	134	147	103	151	158	861
Quinn's Post Poultry Farm	158	152	150	142	122	132	856
W. Becker	145	143	152	136	118	139	833
Dr. Jennings	134	156	125	128	130	159	832
S. McPherson	153	148	91	136	161	134	823
W. and G. W. Hindes	146	136	121	143	126	147	819
N. A. Singer	140	123	141	156	133	122	815
J. H. Jones	133	133	141	145	148	109	809
H. Fraser	119	129	146	141	142	126	803
G. Williams	132	135	136	131	154	115	803
L. G. Innes	86	128	156	142	159	132	803
E. A. Smith	132	120	148	130	136	132	798
T. Fanning	55	145	138	149	154	153	794
Mrs L. Anderson	154	140	146	117	110	111	778
B. Chester	130	104	132	139	132	126	763
S. W. Rooney	104	104	149	122	132	144	755
Range Poultry Farm	95	133	131	147	119	129	754
Mrs. Henderson	109	120	132	122	140	122	745
Thos. Taylor	149	132	95	130	113	119	738
HEAVY BREEDS.							
R. Holmes	141	160	150	146	154	158	909
E. F. Dennis	154	134	155	154	147	158	902
R. Burns	145	125	167	129	169	144	879
D. Fulton	154	162	139	142	90	191	878
A. Shanks	130	145	137	170	115	180	877
A. Gaydon	139	173	136	118	109	167	842
E. Morris	146	143	150	116	137	149	841
W. Smith	94	164	153	151	125	122	809
A. E. Walters	129	134	121	155	116	153	808
E. Oakes	120	153	135	59	150	142	759
J. Cornwell	124	162	129	92	112	140	759
T. Hindley	130	154	123	149	80	118	754
R. B. Sparrow	136	74	142	124	112	148	736
J. E. Ferguson	74	123	88	115	156	125	681
Nobby Poultry Farm	129	171	83	171	93	20	667
E. Stephenson	145	109	107	124	93	82	660

CUTHBERT POTTS,
Principal.

THE FOWL TICK.

A Southern poultry breeder troubled with ticks amongst his fowls would like to see a paper on the subject by Mr. Beard, Instructor in Poultry Raising. He apparently has not seen the very informative article on "The Fowl Tick," by that gentleman, which was published in the "Queensland Agricultural Journal," in August, 1917. As there may be others in like case, we republish the information given in that issue of the Journal. The matter was also discussed at the Poultry Conference at Gatton College, on 29th September last, on which occasion Mr. Walters moved, and Mr. Anderson seconded, a motion that the Agricultural Department be asked to allow Mr. Beard to prepare a pamphlet on the tick. The motion was carried.

Following is Mr. Beard's article:—

SYMPTOMS.

Fowls that have been infested by ticks and recover become immune from further attack. This explains the reason why sometimes flocks of fowl are apparently in the best of health and condition, yet, if examined, they will be found to be covered with the larval ticks, and the houses may be found swarming with the pest. If clean

fowls are put into these yards they will at once become affected and, in three or four days, the result of tick worry and inoculation by the pest, fever will be at its height. The fowls will appear drooping and listless, the combs becoming quite pale; they then lose the use of their legs. Severe diarrhœa sets in, death resulting in a few hours. The better condition the clean birds are in the quicker the poison will act. The fowl ticks themselves are infested with a parasite which they pass into the blood of the fowl, where it becomes a blood parasite, and the micro-organisms multiply with such marvellous rapidity that, in most cases, the fever causes the death of the birds. Every bird in turn becomes a centre of infection for healthy ticks that suck its blood, thus becoming in turn infected, and transmitting the blood parasites into a fresh victim. This disease is known as Spirochætosis in fowls and is caused by a blood parasite. This tiny organism is conveyed from ticks to healthy fowls through the bite of the commonly known poultry tick (*Argus persicus*), its incubation period ranging from three to nine days.

The ticks are capable of transmitting the disease to healthy birds five months after feeding upon the blood of (*Sphiro-chaeta*) infested fowls.

All poultry, fowls, ducks, geese, and turkeys are subject to the disease, but the losses are always greater amongst the first mentioned. This may be accounted for by the fact that the latter are more restless in their habits, therefore the "seed" ticks have not such opportunities of attaching themselves to these birds.

REMEDY AND PREVENTION.

Once the ticks have firmly established themselves in the fowlhouse, it is almost impossible to eradicate them. Therefore the houses and fences should be burnt, likewise any trees that may have been in the pens, and the ground thoroughly disinfected with some strong solution. From experience the following have been found very effective remedies:—Pure kerosene, crude petroleum, creosote, or some of the standard dips, used at a strength of one part of the dip to three parts of water.

The new houses should be of iron, with as little woodwork as possible. The perches, which should be tick proof, can be procured at almost any ironmongery or poultry supply store. A good plan for a perch is to put two supports of sawn timber into the ground. Drive a nail into each at the top; bore a hole in each end of the perch so that the nail will just go through, and then lay the perch in the supports. This will keep it in position, and the perch can be lifted up to see if any ticks are underneath. Tie a piece of flannel round each support of the perch about half way up and, if there are any ticks about, you will in time catch them all, as after feeding on the fowls they will start for their hiding place, but, being full and lazy, will take the first shelter offering, thus you will find them under the perches or under the flannel. The latter can be removed and be burned along with the ticks that hide in it, and be replaced with fresh clean flannel.

Every care should be exercised to ascertain that all birds coming into the yard are clean and free from disease and pests. If there is the slightest doubt, the birds should be placed in strict quarantine for nine days and the coops in which they have been kept thoroughly inspected. If young ticks are discovered clinging to the bodies of the fowls, the birds should be dipped in a strong solution of phenol or Cooper's sheep dip. 1 part of the dip to 200 parts of water, which will kill the pests. After the birds have been dipped in the solution they should be given a teaspoonful of port wine every few hours, and kept in a dry, warm place.

If the fowlhouses are not badly infected the tick can be eradicated by thoroughly spraying with some of the solutions previously mentioned.

On account of its cheapness and the fact that it is so easily prepared, the following is recommended:—Boiling hot soapsuds, to which add ½ oz. crude carbolic to the bucketful. The action of this solution is sure, and if properly applied it will penetrate into the smallest cracks and crevices, which a thicker solution would not reach.

Hot coal tar is also a good thing to use on fences and buildings, but care must be taken that it gets into all the cracks.

If whitewash is used, care must be taken that it is not applied too thick, because as the wash dries a space is left between it and the wood, which makes a good harbour for the pests.

There is yet another method which I have found to be very effective, and that is the use of a blow lamp (such as painters use). The heat and flame from this lamp will penetrate into the smallest cracks and kill all pests that may be concealed therein.

If the poultry keeper will follow out these simple instructions, his yard should soon become free from the pest, and if it does not remain so, he will only have himself to blame for lack of the precautionary measures suggested in regard to the introduction of fresh birds, coops, &c., or non-observance of those warnings contained therein.

Owner.	Breed.	April.	May.	June.	July.	Aug.	Sepr.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total.
						LIGHT BREEDS.								
T. Fanning	White Leghorns	62	125	123	142	156	163	165	146	145	138	124	138	1,627
J. M. Manson	Do.	96	121	126	145	155	154	156	151	130	125	117	120	1,596
E. A. Smith	Do.	80	119	98	131	145	151	152	140	139	135	118	110	1,518
W. Hindes	Do.	106	126	118	131	147	145	140	125	107	133	95	104	1,477
Dr. E. C. Jennings	Do.	89	99	101	128	141	142	146	131	132	121	90	111	1,431
G. W. Hindes	Do.	90	99	98	125	140	139	141	117	121	118	106	109	1,403
W. Becker	Do.	67	97	76	109	138	141	146	135	124	133	115	108	1,389
Haden Poultry Farm	Do.	87	97	108	123	136	138	139	120	107	108	96	86	1,345
Range Poultry Farm	Do.	94	93	90	121	133	141	141	125	117	117	90	73	1,335
B. Caswell	Do.	67	97	87	107	134	147	147	139	121	115	87	74	1,322
Quinn's Post Poultry Farm	Do.	90	67	97	115	141	149	153	125	116	113	88	63	1,317
Dixie Egg Plant	Do.	116	106	111	133	135	148	138	102	111	97	69	49	1,315
C. P. Buchanan	Do.	75	97	86	114	131	133	136	129	114	119	81	85	1,300
Harold Fraser	Do.	80	84	76	118	137	133	138	120	118	116	92	77	1,289
S. McPherson	Do.	84	83	106	129	129	124	124	109	107	114	82	79	1,270
W. Lyall	Do.	89	82	60	105	118	136	125	118	124	124	90	97	1,268
J. H. Jones (Toowoomba)	Do.	99	85	60	123	137	135	142	127	118	101	72	65	1,264
W. A. Wilson	Do.	47	60	108	122	133	129	128	124	117	115	93	79	1,255
L. G. Innes	Do.	58	67	75	120	145	144	158	141	119	79	74	54	1,234
J. J. Davies	Do.	7	78	106	126	137	141	143	129	118	88	84	70	1,227
Thos. Taylor	Do.	90	48	37	103	139	149	143	115	111	108	107	76	1,226
Mrs. A. G. Hurth	Do.	27	71	68	120	138	141	142	128	128	102	85	69	1,219
Mrs. L. F. Anderson	Do.	27	58	103	131	137	144	137	122	110	107	86	44	1,206
S. W. Rooney	Do.	82	72	73	121	122	121	132	102	102	94	107	55	1,183
G. J. Byrnes	Do.	66	101	89	125	121	118	121	103	95	98	91	55	1,183
Mrs. N. Charteris	Do.	72	48	56	93	113	129	123	116	121	117	100	92	1,180
G. Williams	Do.	83	94	82	109	136	125	119	106	102	88	52	45	1,141
N. A. Singer	Do.	53	33	18	110	130	148	134	99	120	90	104	92	1,131
G. Trapp	Do.	80	73	45	94	116	129	135	124	112	77	78	55	1,118
Mrs. R. Hunter	Do.	53	90	68	105	112	124	131	119	100	93	71	47	1,113
O. W. J. Whitman	Do.	54	33	58	93	127	129	137	125	115	97	73	70	1,111
H. A. Jones (Orallo)	Do.	61	92	81	107	126	132	120	81	104	77	62	64	1,107

C. A. Goos	Do.	57	21	79	102	122	124	125	114	104	98	75	54	1,075
B. Chester	Do.	66	49	48	104	123	129	140	110	103	78	66	51	1,067
Oakleigh Poultry Farm	Do.	63	67	44	105	110	123	108	100	95	99	81	67	1,062
H. O. Jones (Blackstone)	Do.	51	52	52	111	124	124	111	108	89	91	89	48	1,050
G. H. Kettle	Do.	10	78	94	113	120	123	130	108	72	85	56	37	1,026
J. W. Newton	Do.	..	36	69	110	121	133	132	119	118	75	59	48	1,020
R. C. J. Turner	Do.	40	69	60	86	107	114	96	115	93	97	72	59	1,008
J. H. Dunbar	Anconas	22	35	66	107	107	106	110	99	71	102	74	75	974
W. Morrissey	White Leghorns	29	52	52	91	111	116	114	99	89	63	71	46	933

HEAVY BREEDS.

R. Holmes	Black Orpingtons	94	146	151	153	167	147	150	132	113	125	116	125	1,619
E. F. Dennis	Do.	80	97	136	150	156	160	157	139	131	132	110	99	1,547
R. Burns	Do.	100	102	115	152	158	147	152	131	132	126	103	123	1,541
E. M. Larsen	Do.	122	127	101	131	145	151	152	122	106	97	83	83	1,420
W. Smith	Do.	88	110	108	118	162	149	144	114	109	108	87	109	1,406
A. E. Walters	Do.	88	131	105	128	146	131	140	103	118	112	100	78	1,380
E. Morris	Do.	56	116	114	130	143	125	133	115	102	101	102	99	1,336
Kelvin Poultry Farm	Plymouth Rocks	67	104	114	144	147	130	130	106	80	101	91	95	1,309
Mars Poultry Farm	Black Orpingtons	34	66	68	120	145	144	154	115	111	121	106	87	1,271
Geo. Nutt	Do.	113	109	122	124	146	135	111	97	79	91	75	65	1,267
T. Hindley	Do.	42	89	89	118	146	137	131	118	112	108	86	78	1,254
R. B. Sparrow	Do.	50	41	45	101	142	144	149	136	120	116	104	100	1,248
Jas. Ferguson	Chinese Langshans	57	94	102	124	126	119	123	102	92	99	95	100	1,233
Nobby Poultry Farm	Black Orpingtons	95	99	83	127	136	143	122	105	93	92	69	59	1,223
A. Shanks	Do.	78	101	116	133	150	141	118	86	87	68	62	42	1,182
A. Homan	Do.	55	50	77	131	108	123	102	123	105	97	89	87	1,147
Burleigh Pens	Do.	71	63	81	97	133	124	103	104	94	105	82	84	1,141
D. Fulton	Do.	82	86	125	115	124	110	112	83	91	77	81	46	1,132
W. H. Reilly	Chinese Langshans	21	95	114	126	119	129	115	91	82	82	87	60	1,121
J. A. Cornwell	Black Orpingtons	13	25	74	131	102	123	118	116	97	114	86	84	1,083
T. W. Leney	Do.	8	74	50	134	130	144	120	99	92	86	66	52	1,055
C. H. Singer	Do.	43	56	67	102	84	128	99	96	96	109	75	68	1,023
H. Puff	Rhode Island Reds	36	95	104	127	116	112	96	68	75	63	61	48	1,001
A. Gaydon	Black Orpingtons	..	3	72	127	115	126	109	90	92	102	75	74	985
H. Ashworth	Do.	13	40	37	93	127	131	108	111	84	101	74	60	979
T. B. Barber	Do.	12	82	82	103	121	119	112	68	76	59	71	38	943
	Totals	4,187	5,355	5,704	7,946	8,824	8,986	8,758	7,635	7,128	6,837	5,758	5,043	82.161

RESULTS OF SINGLE HEN PENS.

—.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
T. Fanning (f)	269	254	267	287	266	284	1,627
J. M. Manson (f)	271	253	286	279	235	272	1,596
E. A. Smith	253	245	268	252	237	263	1,518
W. Hindes	260	258	256	225	228	250	1,477
Dr. Jennings (f)	246	221	236	231	217	280	1,431
G. W. Hindes	253	238	255	228	210	219	1,403
W. Becker	263	243	251	224	192	216	1,389
Haden Poultry Farm	257	240	233	216	176	223	1,345
Range Poultry Farm	207	234	243	240	200	211	1,335
B. Caswell (f)	178	171	213	256	289	215	1,322
Quinn's Post Poultry Farm	211	211	222	265	203	205	1,317
Dixie Egg Plant	203	222	235	202	217	236	1,315
C. P. Buchanan	178	255	188	221	218	240	1,300
H. Fraser	172	246	253	225	158	235	1,289
W. Lyell	204	232	238	198	210	186	1,268
L. G. Innes	149	247	170	210	245	213	1,234
J. J. Davies	213	220	218	177	193	206	1,227
Thos. Taylor	197	170	194	232	239	194	1,226
Mrs. A. G. Kurth	256	222	219	187	166	169	1,219
Mrs. L. F. Anderson	216	240	185	216	161	188	1,206
Mrs. R. Hunter	183	121	216	173	203	217	1,113
O. W. J. Whitman	179	222	161	163	200	186	1,111
HEAVY BREEDS.							
R. Holmes (f)	274	272	299	242	317	215	1,619
E. F. Dennis	247	248	274	258	227	293	1,547
R. Burns (f)	270	224	246	335	247	219	1,541
E. M. Larsen	256	243	278	223	248	172	1,420
W. Smith	220	247	239	205	252	243	1,406
A. E. Walters	254	192	241	235	219	239	1,380
E. Morris	210	213	241	227	265	180	1,336
Kelvin Poultry Farm (f)	290	195	217	163	232	212	1,309
Mars Poultry Farm	198	249	246	185	170	223	1,271
T. Hindley	208	228	191	214	189	224	1,254
Jas. Ferguson (f)	210	278	171	175	206	193	1,233
Nobby Poultry Farm	175	191	179	196	231	251	1,223
A. Shanks	86	158	252	197	226	263	1,182
D. Fulton	172	193	187	170	191	219	1,132
W. H. Reilly	172	160	222	211	166	190	1,121
F. W. Leney	113	170	191	222	170	189	1,055
H. Puff	202	159	169	205	96	170	1,001
T. B. Barber	152	171	118	166	172	164	943

PRIZE MONEY.

LIGHT BREEDS.

		£	s.	d.	£	s.	d.
J. M. Manson, Yeronga—							
Pen aggregate	First	3	3	0			
Single test aggregate	Second	2	2	0			
Winter test aggregate	First	3	3	0			
True to type aggregate	First	3	3	0			
					11	11	0
W. Hindes, Manly—							
Pen aggregate	Third	1	1	0			
Winter test aggregate	Second	2	2	0			
True to type aggregate	Third	1	1	0			
					4	4	0

PRIZE MONEY—*continued.*

LIGHT BREEDS—*continued.*

		£ s. d.	£ s. d.
E. A. Smith, Paddington—			
Pen aggregate	Second	2 2 0	
True to type aggregate	Second	2 2 0	
			4 4 0
B. Caswell, Riverview—Single hen aggregate	First		3 3 0
Dr. E. C. Jennings, Gatton—Single hen aggregate	Third		1 1 0
Dixie Egg Plant—Newmarket Winter test aggregate	Third		1 1 0

HEAVY BREEDS.

		£ s. d.	£ s. d.
R. Holmes, Toowoomba—			
Pen aggregate	First	3 3 0	
Single hen aggregate	Third	1 1 0	
Winter test aggregate	First	3 3 0	
True to type aggregate	First	3 3 0	
			10 10 0
R. Burns, Sladevale—			
Pen aggregate	Second	2 2 0	
Winter test aggregate	Second	2 2 0	
True to type aggregate	Second	2 2 0	
			6 6 0
Kelvin Poultry Farm, Kelvin Grove—Single hen aggregate	First		3 3 0
Jas. Ferguson, Kingaroy—Single hen aggregate	Second		2 2 0
W. Smith, Brisbane—			
Pen aggregate	Third	1 1 0	
True to type aggregate	Third	1 1 0	
			2 2 0
A. E. Walters, Moorooka—Winter test aggregate	Third		1 1 0
Total Prize Money			£50 8 0

STATEMENT OF EXPENDITURE AND RECEIPTS.

Expenditure.	£ s. d.	£ s. d.
Prize money		50 8 0
Food—		
Wheat, 291½ bus.	97 5 5	
Pollard, 415 bus.	50 19 0	
Bran, 226½ bus.	23 13 10	
Cracked corn, 14½ bus.	6 6 8	
Meggitt's meal, 4 cwt.	7 16 3	
Dried blood, 5 cwt.	4 17 6	
Green lucerne, value of	2 0 0	
Soup meat, value of	3 0 0	
		195 18 8
Balance		413 16 5
		£660 3 1

Receipts.	£ s. d.	£ s. d.
Entrance fees		88 10 0
Sales—		
Defence Department, 5,096 doz.	418 13 1	
College dining-hall, 1,750 9/12 doz.	153 0 0	
		571 13 1
		£660 3 1

A FAMILY'S EXPERIENCE IN POULTRY FARMING.

Many people are impressed with the idea that a good thing is to be made out of poultry-farming, and the result has been that, having started the business with no other experience than the running of a few hens of mixed breeds on the farm, these sanguine people have found, to their cost, that much more is required, to be successful in poultry-farming.

A short time ago we were given the experience of a family, whose hopes were raised by friends who pointed out the large profits to be made in this industry. On the principle that "a little nonsense now and then is relished by the wisest men," we give this to our poultry friends:—

Many years ago, we were strongly advised to go in for poultry-farming, being assured that a fortune was to be made in the business. We had a large area of ground in one of the suburbs of Brisbane, so we decided to enter on such a lucrative business. We erected the necessary poultry houses, purchased brooders, incubators, &c., and fenced in runs for the expected chickens. Then a number of expensive prize birds was obtained; and our first object was to raise birds for export, and in a short time we had about a hundred head of different breeds. One shipment was sent away per medium of the Department of Agriculture and Stock. In due time we received the account sales, which disclosed such a loss that we decided to give up all hope of making money by exporting birds to England, and therefore took the advice of an expert, as he was called, which was, to run fowls for show purposes and sell settings of prize eggs. But here, again, we met with disaster, for everybody had prize eggs and fowls for sale. So, after devoting any amount of time, trouble, and expense to this phase of the business, it proved a failure. We tried selling the eggs to the stores, but all they would offer us was 6d. a dozen for eggs the size of ducks' eggs.

Finally, we tried ducks and turkeys, but all proved a failure financially.

Having become thoroughly disillusioned with respect to poultry-farming, we sold and killed off most of the birds, sold the incubators, &c. As for the brooders, these came to a tragic end. No buyer could be found for them, so they were stacked in a cow shed. There again, Nemesis pursued us, for a cow was one day tied up near them, to be washed. This perverse animal took a dislike to the boy in charge of it, and after kicking and plunging, it half-killed the boy, then made a flying leap and landed on top of the brooders, and jumped about on them until they were reduced to kindling wood and lay in a mangled, dejected mass on the ground. Such was our experience of High Class Poultry Farming.

Moral:—*Ne sutor ultra crepidam.*

ABOUT MUSCOVY DUCKLINGS.

By R. T. G. CAREY, Muscovy Breeder, Beerwah, Queensland.

When the duckling breaks through its oval prison, or egg shell, which it does by pipping the large end of the egg shell in such a manner so as to remove it like a cap, off, it gives a struggle; and forth from the incasement it comes, and is neither pretty nor cunning, downy nor fluffy—not at first.

At the moment of birth, it is covered with what is apparently a layer of hairs—not with a covering of downy fluff. Those hairs rapidly dry and begin to uncurl and unfurl themselves into what is termed down. That is the duckling's first garment for several weeks.

When they are hatched, Nature has supplied them with food of sufficient quantity and quality to last from three to four days. This source of supply is the "yolk" of the egg, which was absorbed by the duckling into the body just before hatching.

This yolk should be assimilated or thoroughly digested in thirty-six hours, otherwise digestive disorder will result.

In order to avoid those troubles, ducklings must not be fed until they are at least 48 hours old; after that period give them some sharp sand or fine grit, and cool water. A couple of hours later commence to feed them. You can safely give small chick grain or canary seeds, or a dry crumbly mash of wheat bran 1 oz., pollard 2 oz., moistened with sour milk. That is enough for mother duck and twelve ducklings per meal. Rolled oats are too large, but oatmeal sifted is better. Ducklings must be fed every two or three hours during the day until they are one week old.

Then the frequency of feeding should be reduced gradually until they need feeding only two or three times a day.

Good results may be obtained by feeding hard-boiled eggs, wet mash, Johnny-cakes, bread crumbs moistened with sweet or sour milk or a little beef-gravy, but those systems involve extra unnecessary labour. Just as good results can be obtained by the simple mash food and cracked fine grain, beef scraps, constant supply of clean fresh water, plenty of sharp grit and charcoal—then bowel or other intestinal trouble will not be so common as under the former old-fashioned, fussy style.

The dry mash should be kept before the ducklings at all times after they are four or five days old. When natural herbage is scarce, try lucerne, lettuce, chopped onions, sprouted oats, or any other green foliage, herbage grass, young cane tops, or tender maize stalks, &c.

During transit, day-old ducklings can carry very well and arrive in good condition where the journey occupies less than 100 hours from birth; therefore should you live within the radius of 400 or 500 miles from duck farmers, you could safely feel assured of receiving them alive and in excellent condition as if when removed from their mothers or incubators. Whether it be boat, rail, or coach routes, it is much safer to order day-old ducklings than eggs, whereas the ducklings are generally handled much more carefully and more gently than eggs.

When the ducklings arrive, have the brooder or place where they are proposed to be kept "ready" thoroughly clean—a good sand or dry earth floor, and have the brooder heated to about 75 or 80 degrees before placing them therein. Keep that heat up for about one week; then gradually run it down and dispense with it as soon as possible, as ducklings can maintain their own temperature and thrive.

The golden rule in feeding ducklings is, "more brains than grains." More are killed by grains than by brains—that is, by over-kindness in feeding than under-feeding.

LOSS BETWEEN CUTTING AND MILLING CANE.

HIGHLY IMPORTANT FIGURES.

In Hawaii recently thirty sticks of uniform Yellow Caledonia were divided into ten samples, which were subsequently ground on successive days, the weight of each lot being also taken from day to day. The figures are shown in the table produced herewith:—

Age of Cane After Cutting, Days.	Weight of the Cane, Lb.	Weight Lost, Per Cent.	Analysis of the Juice.				Sugar Per 100 of Cane.	Sugar Lost Per Cent.
			Brix.	Polarization.	Purity.	Quantity ratio.		
—	17½	—	21.7	18.78	86.54	7.11	14.065	—
1	17	—	21.8	20.07	92.06	6.44	15.527	—
2	16¾	1.38	22.30	19.75	88.56	6.68	14.763	5.57
3	16½	4.76	22.00	18.05	82.05	7.59	12.548	19.19
4	16¼	6.15	22.60	18.19	80.49	7.61	12.332	20.58
5	16¼	4.48	25.50	17.06	75.82	8.40	11.371	26.77
6	16¼	4.00	22.70	16.02	70.57	9.36	10.256	33.95
7	16	6.15	22.70	16.44	72.42	8.97	10.463	32.61
8	15¾	10.29	23.30	17.50	75.06	8.24	10.887	29.88
9	15½	11.43	23.10	17.42	75.41	8.25	10.736	30.86

Other tests were carried out with D.1135, Lahaina, and H.109. In the case of Lahaina and H.109, for example, the increase in the tons of cane required to manufacture a ton of sugar after two, four, and six days was: 0.07, 0.11; 1.37, 0.43; and 3.48, 0.80 per cent. respectively for the two varieties. By combining the weight losses and the decline in quality, the loss of available sugar was calculated to be after two, four, and six days for the same two kinds of cane: 5.7, 2.8; 24.7, 12.2; and 41.4, 18.0 per cent. respectively.

The losses are really less than might actually obtain, as the same formula for expressing the quality ratio was used for fresh and old cane alike. It is obvious that the fibre per cent. would increase as the cane dried up; while if the actual polarisation per cent. had been determined in all cases, still higher losses would have been indicated. Moreover, not only is there a loss of sugar, but also a deterioration of the quality of the juice, making milling and boiling more difficult.—"South African Sugar Journal."

The Orchard.

TAKING WATER OUT OF FRUIT.

In last month's Journal we published portion of an article on drying fruits, which appeared in the Brisbane "Daily Mail." The following is the concluding part of the subject:—

CHEAP TRANSPORT.

"Germany had three plants in 1898 and 1,900 in 1900, while 2,000 breweries were using part of their machinery for the drying of foodstuffs. She saw, as America had seen, that this process increases production by the saving of those foodstuffs that at present go to waste. By the elimination of unnecessary water it facilitates transportation. It is economical, because less money will purchase a greater quantity of food values. There has been much hunger in days gone by for the reason that supply could not be regulated to always satisfy demand. Earliest history records sun-drying as the means of food preservation. For a long period of time it was the only method; then canning happened. Canning has never been able to always satisfy demand.

"By means of dehydration only replaceable water is removed. It is taken from around the cells that contain the food substances. This means that the food substance, food materials, salts, and so forth contained in the products are concentrated. Nutritional food value is not depreciated. Flavour-giving compounds are preserved intact. In future many food products which have not in the past been exported owing to impossibility to transport in fresh condition will be available to the masses. It is estimated that about half of the fruits and vegetables grown for the market never reach the consumer. Dehydration will save a great proportion of the half which has been lost. Thus it will bring down the cost of living. One ship will convey the same amount of dehydrated foodstuffs as 10 ships will carry of refrigerated or fresh foodstuffs.

"WATER FROM THE TAP."

"A man who purchases canned products pays food value price for about 85 per cent. of water contained in the product, water in the syrup, and the transporation costs of the weight of that water, not to mention the tin can. The man who purchases dehydrated food pays for about 100 per cent. of food value at food value rates and no water transportation. The necessary water is supplied from the tap at water rates. If a cannery is operating in the same district as a dehydrator, the latter can treat all the products that the cannery may can, and, in addition, can dehydrate many products that a cannery cannot can.

"The sun-drying method is positively corrupt in comparison with modern dehydration methods. The sun has been practically eliminated from the divinity business, and when you use it to dry foodstuffs you leave the products in the sun where the dust and filth of the earth must collect on them. Not a particle of dust or dirt contaminates a dehydrated product. Which will the consumer of to-morrow prefer? Dehydraters will come here shortly, and will revolutionise the sale of foodstuffs. To soldiers growing fruits they will prove a blessing. Apples, peaches, apricots, tomatoes, pears, prunes, pineapples, cabbages, pumpkins, onions, celery, carrots, or any other thing the digger can grow can be dehydrated."

WHEAT PRICE FIXED.

The conference between representatives of the Commonwealth and the various States concluded its deliberations on 1st November last. With the exception of Western Australia, all the Premiers of the States, and the Prime Minister, were present. The conference decided to fix the price of wheat for home consumption at 9s. per bushel.

Tropical Industries.

PREMATURE ARROWING OF SUGAR-CANE.

ITS CAUSES AND EFFECTS.

By G. A. LABARTHE, in the Bulletin de l' Association des Chimistes de France.

The different opinions expressed on the causes of premature arrowing of cane are very diverse and contradictory. Some have explained the phenomenon by saying that reproduction by means of seedlings has determined little by little certain modifications in the formation of the flower organs destined by nature to ensure the reproduction of the species. This opinion is demonstrated by the fact that native canes that grow freely always arrow at the time of maturity; but this theory is contradicted by the fact that some plants that have reproduced through seedlings for centuries, such as the vine, have kept a normal flowering. The other two following theories are contradictory.

One says that insufficiency of soil food, lack of manure, and in general all circumstances that keep back the growing of the cane favour flowering. In consequence the canes should be fortified during summer by supplying nitrogen in a readily assimilable form such as nitrates dissolved in irrigation water.

The other theory contends that flowering is favoured by a strong vegetation and mostly through an excess of nitrogen in the soil, the consequent remedy being to use all possible means to check vegetation; no irrigation and less nitrogen.

But none of these theories explains the flowering of cane in the different circumstances in which it is met. Mr. Larbarthe's observations were made on fields of 6,500 hectares in different climatic conditions and comprised soils of different compositions. These led him to consider that flowering was a consequence of a disproportion arising between the amount of moisture absorbed by the roots and that evaporated through the leaves. This causes the sap to ascend more slowly, and then nature tries to bring back the equilibrium by giving forth new organs of evaporation which at the same time assure the reproduction of the specimen.

So, accordingly, all reasons bringing about either too much absorption by the roots or not enough evaporation by the leaves will favour arrowing.

It is a well-known fact that water is issued in the state of steam or vapour from the leaves. This water that is produced by the protoplasma and the chlorophyl functions comes to the whole surface of the cuticle, but mostly through the stomata. But if at the beginning of summer the soil lacks water, and if to the effects of a high temperature are added that of the wind and sudden changes in the hygroscopic state of the atmosphere, then the cellulose cuticle gets thicker and the stomata diminishes in number and in efficiency, and evaporation becomes insufficient. The plant tries to get new organs of evaporation to make up for the old ones that are no longer sufficient.

When the plant is in that condition the planter generally tries to better it by irrigation. The results of this might be favourable or not according to the development of the roots. If they are too developed through a lack of nitrogen, then they absorb too much water and arrowing is hastened. If, on the contrary, the growth of the roots has been normal, the vegetation is normally resumed after a while.

So the observations of Mr. Labarthe have led him to the following conclusion. An excess of moisture in the soil favours arrowing, and the more developed are the roots and the less are the evaporating organs the quicker the phenomenon is produced.

As for the effects, the opinions are more at variance even than for those of the causes. Boname has observed that as soon as the flowers appear the sucrose content ceases going higher and the time of the crop is the same as it was before arrowing.

I. Venderghem comes to the same conclusion, remarking that it then contains more fibre and less juice.

From the personal observations of the author the arrowed canes give a juice of a lower sucrose content, contain more glucose while the crop diminishes in weight, while the percentage of juice also becomes less. The author concludes by giving the following advice:—Select a non-arrowing specie, plant nearer, use nitrogenous manure, drain excess of water.—Reprint from the "South African Sugar Journal."

COFFEE GROWING IN QUEENSLAND.

No. 1.

BY T. A. BROMILEY, Instructor in Coffee Culture,
Department of Agriculture and Stock.

One of the multitude of economic crops Queensland has proved herself capable of producing to perfection is coffee. Years ago, under the guidance of an able instructor, M. H. Newport, it seemed likely that this crop would become one of our staple agricultural products. In the North a considerable aggregate area was planted; the trees bore abundantly in some cases, it is averred, as much as 15 cwt. of beans per acre were garnered under favourable conditions and good cultivation.

The average for years was 10 cwt. per acre. Such results have been frequently obtained in the southern parts of the State, indeed surpassed. After nearly thirty years of cultivation of coffee in Queensland, the writer has never seen any form of disease attack the trees. Notwithstanding these most favourable conditions, the acreage under coffee declined. This falling off was the result of several causes. Perhaps the universal planting of sugar-cane, and consequent diversion of labour to the canefields, had much to do with it in some districts, as coffee ripens about the time canecutting commences.

This dearth of labour would be acutely felt in the larger areas, and, as these conditions could not be altered, many fields went out of cultivation wholly, or in part, in consequence.

Another deterrent factor, for the small grower, at any rate, would be the lack of a marketing centre. Having, probably, no purchaser for his crop but the local storekeeper, who, in his turn, had only his restricted local market, could not but have a depressing effect, at least such conditions would not tend to the expansion of the coffee industry.

This state of affairs certainly obtained in the southern portion of Queensland. This disability the Minister of Agriculture will remove as far as possible by a plan to be mentioned later in this article.

The novelty of the crop to Queensland farmers, no doubt, led to many mistakes in the field and handling of the harvest.

Until a larger settled population occupies the central coast districts, this scarcity of labour will continue near the canefields.

But there are whole tracts of country far removed from the canefields, eminently suited to the production of coffee in both the northern and southern parts of the State. It is quite possible that this difficulty of inadequate supply of labour for harvesting may be overcome by a system of co-operation, but the cultivation of the crop at present cannot be undertaken in the way of large estates. It is, however, especially suited to the small grower, with several children to assist in picking time. The harvesting finished, the balance of the year's work upon an acre or two would be very light, and would take but a few days. The coffee tree is as easily grown as any other fruit tree, and with less trouble and expense than some, as, so far, it has shown no sign of disease, therefore spraying and washing are not necessary. No special cultivation is needed beyond such attention as a careful fruitgrower would give to his trees. The yield per tree averages higher than in some coffee-growing countries.

The labour of harvesting the crop—that is, the picking of the berries—is well within the power of juveniles of ten or twelve years of age. The shrub will grow well and bear abundantly in any moderately fertile land out of reach of severe frost and where there is an average yearly rainfall of, say, 38 inches. When the tree is established, it will stand spells of dry weather as well as any other crop we cultivate. Most newly opened scrub land, if undulating and naturally drained, is perfect for coffee, the yield abundant, and of high grade. But the shrub will accommodate itself to a greater range of soils and situations than some other fruit-bearing trees. The writer has seen it growing and cropping well on the sea-coast not more than a hundred yards from high water, and only 50 or 60 ft. above it, the soil being blady grass forest. In another district a few trees doing well in coarse, gritty, river drift. Of course, such soils and situations as these latter are not recommended, and are only mentioned to show the farmer, or others who would try coffee growing, that the land they have will answer, subject to the conditions of freedom from frost and with a fair rainfall. Light frost, if not too long continued, will not hurt the tree.

It will thus be seen it is not a question of "Will coffee grow in Queensland?" nor of "Will it yield profitable crops?" Those questions have long since been answered in the affirmative.

Not only does it bear heavily and regularly, but its product has been classed in London as amongst the world's best.

Latest figures of imports into the Commonwealth show that 2,605,240 lb. of coffee came in from overseas. Queensland ought to capture the bulk of that trade. It can, and must, be done. The state of our national finances demands that we send not one shilling away for what we can, with a little Government assistance to help over several initial difficulties, produce at home. What, it may be asked, is the nature of these difficulties? Can they be surmounted? With regard to the first question, reference to what has been written in the former part of these notes will show that they may be summed up under three heads. First, shortage of labour in some districts for harvest work. Second, need for a market at some central point where merchants and others might see that a first-class article can be produced in quantity in Queensland at a price, quality considered, almost, if not quite as cheaply, as from other parts of the world. The third obstacle is a minor one; still, it is an obstacle, but easily overcome.

With regard to the first, it is suggested that farmers, soldier settlers, and others following rural pursuits plant a patch as an auxiliary to their incomes. A few hundred trees, up to an acre or two, could be easily tended, as has been intimated above, and the remuneration, as will be shown later, very encouraging.

As a cover for poultry, a field of coffee has no equal. By the way, this feature might receive the attention of those engaged in poultry-raising in the warmer parts of the State. Light dressings from the fowl-yard would keep the trees in splendid health and ensure maximum yields. The shade of the trees would do the same for the fowls. Then co-operation in the treatment of the berries, that is the "pulping"—taking off the red outer skin by means of a small machine called a "pulper"—followed by fermenting, washing, and drying.

In any co-operative effort it may be assumed the Government would assist.

The second condition has received serious consideration by the Honourable the Minister of Agriculture, who has taken steps to meet it by establishing the system so successful in cotton production—namely, to make advances upon coffee in "parchment" consigned to the Under Secretary for further treatment, that is, "hulling" or "peeling"—removing the inner or "parchment" skin—grading, and marketing. By this means the grower is relieved of the most difficult part of the work of preparing the beans for market; and, what is of paramount importance to the grower, his coffee will thus be placed under the immediate notice of bulk buyers. The amount of advance the Minister proposes to make is 7d. per lb. for properly prepared, clean parchment. Reckoning the yield per acre at 1,000 lb., a not at all extravagant estimate, the gross return would be £29 3s. 4d. The finished beans should be worth not less than 1s. per lb., which would be £50; but from this sum must be deducted the loss of weight of parchment skin, about 18 per cent., and the cost of hulling, which two items together would aggregate about £13 10s. This deducted from £50 would, of course, leave the net amount of £36 10s. These calculations are based on pre-war prices. At present, higher rates prevail. Last year, 1919, the writer offered for parchment coffee 1s. per lb. for a ton or more; the offer was rejected. He bought cleaned coffee at 1s. 5d. per lb., freight on. These prices may hold for some time, or they may not. But the prices mentioned above will continue, with the possibility of an advance. The trifling difficulty of unfamiliarity with coffee production by agriculturists, Mr. Gillies has adopted means to remove by the appointment of a Queensland coffee grower of many years experience in all branches of the business to the position of instructor and inspector in coffee production. It is expected, when this gentleman shall have visited the farmers in such parts of the State as are climatically suited to the coffee crop, all difficulties and uncertainties will have disappeared.

THE CENTRAL SUGAR DISTRICTS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Field Assistant, Mr. J. C. Murray:—

During the month the following cane areas have been visited:—Woongarra, Barolin, Kalkie, Avondale, Millbank, Sharon, Gooburrum, and Bucca.

With regard to the sub-areas of Bundaberg, taking Woongarra, Kalkie, and Barolin firstly, there is a marked increase in the prospect for next year compared with the last time of visiting. The autumn planting is looking well, and more recently planted cane has struck nicely, and with occasional showers should make good growth now that winter and the likelihood of frosts have passed. Cutting is in full swing at present, and any cultivation necessary is in abeyance till this is over.

This usually trying portion of the season seems to be progressing favourably, with an abundance of suitable labour and very little labour trouble.

A noticeable feature of the cane on these areas this year is the increase of the sugar-cane moth borer. The presence of this parasite accounts, no doubt, largely for the fluctuations in the returns for cane that the farmers receive from the mill. Not only is there a loss with regard to the commercial cane sugar that would be in infested cane, but when the borer is present there are other factors operating against the success of the crop, and which are incidental to the presence of the moth.

It is noticeable in places on the Woongarra that in a number of cases the borer has attacked the eyes of the plant cane, and left it very weak and stunted. This cane will probably do no good at all.

In other cases fungous diseases have collected on the holes, and the weakened cane has been knocked over by the wind.

Careful watch should be kept in unaffected fields, and if a stick of cane shows that it has been bored, it would be as well to cut it down and burn the stick before the borers have time to emerge.

Lime is badly wanted on these areas at present, as the average reaction of the soil shows a slight increase in the amount of acidity.

Burning cane is being practised considerably before cutting, an excellent arrangement for the cutter, but one by which the farmer runs a number of risks.

With regard to varieties, it is noticeable that those making most progress are probably H.Q. 426, Badila, D. 1135, M.S. 1900, H.Q. 285, N.G. 114, Black Innis, and H.Q. 813. Most of these canes are affected by the borer, although Clark's Seedling seems to suffer most. Badila is attacked badly in places.

On the other Bundaberg areas—Millbank, Gooburrum, and Sharon—matters are very much the same as at the time of last visiting, with the exception that the plant cane, principally D. 1135, is more forward and looks well for next season. Cutting is in full swing, and will occupy a few weeks yet. A small crop only is being taken off, but, with ordinary luck, next season should be a very fair one. Many of the farmers on these areas are indulging in mixed farming, growing only a small quantity of cane, although the recent rise in the price of sugar has been a great incentive to many growers to plant more than they originally intended to.

The moth borer is rampant on these areas as well as those previously mentioned east of Bundaberg. The previous remarks made apply to the western fields as well. There is a real danger in this menace to sugar-cane, and only by strenuous and careful efforts can the farmers check the pest.

Rain is again badly wanted; in fact, for conditions to be ideal, it wants at least an inch a week. Lime is still a great need, a factor which the farmers are well aware of, but prevented from getting adequate supplies owing to high initial cost.

Avondale farmers are busy cutting at present, consequently farming operations are for a week or so at a standstill.

On the plantation the outlook is good, and the company are well satisfied with their crop this year, all things considered. Still, Yuban cane is not a variety that commends itself to the small farmer, principally owing to the objection the cutter has to it. It certainly makes a good showing, and on the plantation a cut is expected of about 24 tons per acre. This is fair, considering the past season.

The borer is also in evidence at Avondale, although not so much as at Bundaberg. Great care should be taken by the farmers in the selection of the plants here, if they wish to keep a check on the moth, as plants coming from an infected area would almost be certain (if not carefully examined before planting) to contain a borer here and there.

The soil here is in good condition, except for showing slightly acid in some places and stronger in others. This land would grow cane splendidly if a good water supply was insured. As it is, too often the farmers fail, through not their own faults but by the fickleness of Nature.

With regard to cane growing at Bucca, much more planting is being done than previously, and the farmers are cheerful about their prospects. Cutting is going ahead at present, and the growers have a long way to transport their cane, but, nothing daunted, they are overcoming their difficulties gradually.

Lime is still a prime necessity for the soil, also green manures to restore humus and conserve moisture.

With regard to pests, the borer is in evidence, although not badly. Here, as well, careful selection of plants and observation of unaffected cane will help largely to stop its ravages.

Touching on varieties, D. 1135 seems to be the most payable variety at present, although it is probable that some of the later raised Queensland seedlings, such as H.Q. 855 or 813, should do well here.

REPORT ON CANEFIELDS IN THE CENTRAL DISTRICTS.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Field Assistant, Mr. J. C. Murray:—

GIN GIN AND MAROONDAN.

Growers on these areas were, at the time of inspecting, anxiously on the lookout for rain. Since then, however, a considerable amount of wet weather has prevailed, which should greatly improve the growing cane and enhance the prospects for next year.

In spite of the fact that weather conditions during the last ten months have been very trying, the farmers have managed to do a good deal of planting and cultivating. The farms present a pleasing aspect, being free from weeds and other signs of deterioration that occur if land is neglected. The staple varieties continue to be D. 1135 and 1900 Seedling, mostly the former. There are others growing, but none are doing sufficiently well to justify the growers displacing the Demarara. Remarks made in previous reports on varieties of Gin Gin may still be applied.

Not a great deal of trouble is being experienced with cane pests. The sugar cane moth borer is in evidence on some farms, although not in sufficient numbers to cause much damage. It is probable that this parasite is largely kept in check by a very voracious black ant, which enters the holes and destroys the borer. On farms where there are none of these ants, and the borer is present, it would be a good idea if the farmers were to introduce them.

Root nematodes attack any cane that is poor and not well grown, but it is probable that with good weather conditions and dressings of lime, the nematodes would disappear.

Growers should be very careful in the selection of plants; none but the best and healthiest cane available should be planted, and care should be taken to see that no plant is bored when placed in the ground.

At Maroondan the dry weather was still holding, although since then good rains have fallen. The heavy black soil was taking a lot of breaking up, but still, all things considered, the farmers appeared to have done very well.

In soils of the type that prevail around Maroondan, much cultivation is very essential. The grower who can lime liberally is on the right track here. With regard to cane pests, the same remarks can apply here as west of Gin Gin. Weeds are a source of trouble to the grower, *Sida retusa* growing to a considerable size, with an enormous root.

1900 Seedling and D. 1135 are the staple canes here, finding favour with the grower in the order named. A gratifying feature about cane grown on this area is that the yield of c.c.s. is generally higher than the average.

Remarks made previously on careful selection of plants would also apply here.

BINGERA.

From observations made, conditions at Bingera appear to be very satisfactory. The plant cane is coming along well, and now that the growers have been visited with such good rain, the prospects for next year should be better than they have been for quite a long time. D. 1135 is the staple growing, both on the plantation and farms, although some of the older canes, such as Cheribon, are giving satisfactory results to some growers. Cane pests are giving very little trouble, although the grub carries on his usual ravages on a small scale.

Noxious weeds are well under hand, and farmers generally, including the plantation management, are to be congratulated on the fine appearance of their cultivation.

CHILDERS.

The plant crop was looking well here at the time of visiting, and since then some six inches of rain have fallen, which give the district a very fair chance of a big crop next year. There is a bigger area under plant cane than has been the case for some time, the farmers previous to the last planting having determined to get a fair start with renewed cultivation, and a thorough cleaning up of the rubbish that bad seasons had left.

This was badly wanted, as checked and badly growing cane had become a refuge for cane parasites in the latter part of last year, and in many cases the fire stick was the best thing that could be recommended. However, now the cleanliness is striking, and, with the exception of small areas attacked by grubs and borers, the cane is free from parasitic trouble.

Again, as remarked before, if the clean and well kept appearance is to continue, the careful selection of cane plants must have careful consideration, and growers should be cautious not to select cane from areas that are attacked by parasites, or cane that is suffering a reversion in type. If the growers wish to keep the present staple varieties up to standard, these matters should be carefully observed. With regard to varieties, there is nothing new to mention since previously visiting Childers. D. 1135 and 1900 are still the principal varieties. Q. 855 would probably justify planting on these areas, also Q. 813. If frosts have occurred at Childers this winter, they have been light, as the cane shows no sign of having been touched. Much of this year's cutting is poor quality and high in fibre, but this is not to be wondered at, considering the disadvantages the farmers have been labouring under.

Cutters are not as careful in trashing as they might be. The topping in a number of cases is unsatisfactory. This is hard on the grower whose cut is only small, and anything that prevents him from getting the best return possible tends to have a discouraging effect in these hard times. Lime would be a distinct advantage on most of the Childers farms, and arsenic could be tried in small quantities when the grub is bad. Green manuring is to be recommended.

MARYBOROUGH.

Conditions at the time of visiting had not altered much since the previous inspection. Most of the cane is grown as a by-product, farmers finding, in view of the high price of legumes, &c., that it is more profitable to grow these commodities. However, what cane there is planted looks well, and since good rains have fallen, which should give the mill something to do above normal next year. Many of the older varieties find favour around Maryborough, such as Striped Singapore, and it is likely that, seeing from these the land has had a spell for ten or fifteen years, it might pay to reintroduce those which have a good sugar content and suffer from no specific disease. From tests taken of the soil, the use of lime is to be recommended at present, also the use of vegetable manures.

During the inspection of the Maryborough district a visit was made to Mr. Braddock's property at Turkey Island, at the mouth of the Mary River. This island has about 500 acres fit for cultivation, if cleared and drained. The soil is a sandy loam, and is at present covered with short, fairly straight timber, consisting of bloodwood, tiltree, and bluegum. There is an undergrowth of jungle vines and lantana. It is a proposition that wants taking energetically, and clearing and ploughing, as well as draining in places.

If this is done, good crops will result. Through the courtesy of Mr. Braddock, a day was spent on the island, and no doubt the proposition is a good one if the owners decide to go on with it. At present a small area has been noted and planted in more or less of an experimental measure. The varieties growing are D. 1135, 1900, and Black Innis. It is probable that Badila would grow there, as well as some of the later Queensland Seedlings, such as 813 or 855.

The island is free from frosts, and will further produce bananas, oats, legumes, cabbages, &c.

MOUNT BAUPLE.

Owing to rain some time was lost at Mount Bauple. From what could be observed, however, the prospects are good for next season, and a considerable quantity of cane is being crushed at the mill. Some that is at present going through is high in fibre, although most of the cane is giving fair returns of c.c.s., especially 1900 Seedling. The moth borer is in evidence, and may probably account for the difference in sugar content that often puzzles the farmer. The general appearance of the Mount Bauple area is much better than previously seen, all vegetation having a healthy green colour, the young cane looking especially bright after the rain.

Crushing has gone with a swing, no troubles, except of a minor nature, having been experienced.

PIALBA.

This district was showing the effect of the recent rains, and there is a feeling amongst the growers that next year will be a good one. Of late, the weather conditions here have been anything but encouraging, and the ground, prior to the wet weather, was very hard. However, the farms now present a well-cared-for aspect, and other crops besides cane look well, particularly the bananas out the mountain way, a product that many farmers are raising in connection with sugar-cane.

The staple variety here is the D. 1135, although some growers are getting good results from H.Q. 285 and Rappoe.

Not much time was available at Pialba, but the farmers that were seen expressed a keen interest in the work of fertilisation and the taking of soil samples for analysis, also information relative to variety propagation and experiment.

Lime would be of the greatest benefit to Pialba growers, also, if possible, planting with green crops for the purpose of rotation and ploughing in. Operations such as these are calculated to restore nitrogen and give greater body to soils, thus

adding to their drought-resisting properties. Cane pests the farmers are fairly free of, although it would be advisable to burn off useless cane that has died from various causes, and is noticeable here and there. The patches of rubbish harbour parasites, and a fire is a very effective method with regard to these.

Cutting operations passed off without any trouble, and the cane cut, although fairly high in fibre, is yielding a fair sugar content.

YERRA.

More planting is being done here than previously, and should the farmers have any luck, a fair tonnage next year will come from this place.

Most of the people here grow just a small quantity of cane in connection with other pursuits, although Mr. Fielding expects to have about 25 acres planted shortly. This gentleman is taking in more land from the scrub, and, judging by the class of soil cleared, good crops should be grown. There is a fair amount of scrub land around suitable for cane, although some of the more low-lying portions are badly frosted. The great drawback is that the country is hilly, and even if farmers only have to cart a short distance, haulage gets very irksome. Still, this is a good district, with abundance of rich forest loam awaiting to be cleared. As previously remarked, lack of good roads is the great drawback. No doubt this will be remedied in a few years.

THE EARLY SUGAR MILLS OF QUEENSLAND.

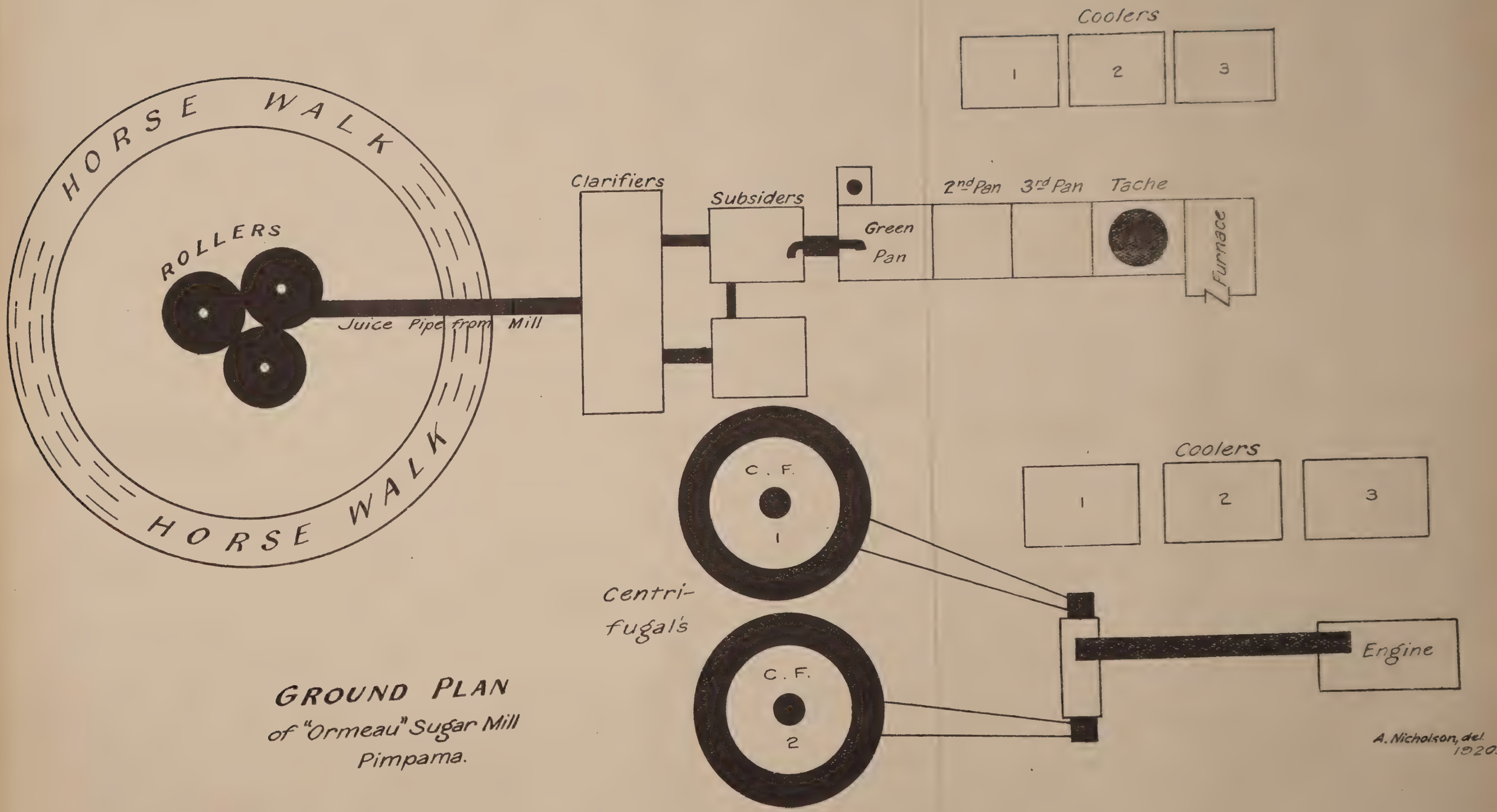
In the early days of sugar-growing in Queensland there was no such thing as the modern sugar mill. One form of mill consisted of three upright rollers, about 2 ft. high and 15 or 18 in. in diameter. Some of these rollers were driven by four horses walking round a circular horse path and harnessed to each end of a beam to which one of the rollers was attached. The work was very heavy, and at least eight horses were required for relief. The "battery" consisted of two oblong pans into which the juice from the rollers was led. There it was clarified by liming, on attaining a heat of about 140 deg. F. From these clarifiers the juice was led by pipes to two lower pans called subsiders. There the scum was removed by large perforated ladles, and then the juice went to the first pan (the green pan of the battery). There were four large square pans, and one circular one called "the tache." In the first four the juice was frequently skimmed while boiling, a roaring fire being maintained in the furnace beneath them. On arrival at the tache, the juice was bucketed into it, and it was boiled until it bubbled like porridge. At this stage, a circular bucket with a valve at the bottom, was lowered into the tache, and conveyed the contents to the wooden coolers, where it was left to granulate. This process was repeated as fast as the tache was refilled from the pans. Should the sugar boiler not be careful to note the appearance of the concentrated juice when boiling in the tache, the result would be that instead of granulating, in the coolers, a sticky slimy mass would be produced which went by the name of "sling," without any granulated sugar.

To give an idea of the amount of work which such a mill would do daily, the writer, who erected one on his plantation, "Ormeau," Pimpama, about the year 1869, was well pleased if 1,800 gallons of juice were obtained from a day's crushing. The average was about 800 gallons, and it took about 20 tons of cane to make one ton of sugar.

Some growers drained their sugar in wooden bins, the bottoms of which were perforated with numerous holes, into each one of which a stick of banana stalk was stuck. This was a terribly slow process, and the resulting sugar still held a certain amount of molasses, which in course of transit, oozed through the mats in which the sugar was in those days marketed. One mill owner, having read up the "claying" of sugar in the West Indies, placed a layer of some kind of white clay on top of the sugar in the bins, and freely watered it. To some extent, this watering washed away the molasses from the sugar, which then had a dull, gray appearance, but was saleable at a slightly higher figure than the dark, brown "Muscovado." Later on, centrifugals, Bauer-pans, and Wetzel pans were introduced, into which the steam passed through coils. Triple effets and vacuum pans had not then arrived. The cost of such a mill as I have described was about £200, and the crushing power was so weak that juice could be squeezed out of canes which had been passed through the rollers. And to conclude, how were the canes passed through? A man sat on the bedplate of the mill and fed the canes one by one. If three canes, or even two of extra thickness should attempt to pass together, the mill stopped. The number of hands required to work this primitive machine was a horse-driver, two cane carters, a sugar boiler, four men skimming the pans, one man at the final tache, one man working the crane, one fireman, one man at the subsiders, one man to feed the mill—a total of thirteen all told. When the centrifugals were installed in 1868 and an engine took the place of horses, two mechanics were needed.

PLATE 21.
MAJOR A. J. BOYD'S SUGAR MILL AND BOILING HOUSE, "ORMEAU," PIMPAMA, 1869.

PLATE 22.
THE HOUSE AND GARDEN AND CANE NURSERY.



GROUND PLAN
of "Ormeau" Sugar Mill
Pimpama.

Botany.

ON TWO SPECIES OF KURRAJONG (BRACHYCHITON) OCCURRING IN QUEENSLAND.

By C. T. WHITE, F.L.S., Government Botanist.

From time to time specimens of a tree have been sent to the Department for identification from North Queensland. This has been variously identified by the Botanical Division as *Brachychiton diversifolium* (*syn.* Sterculia caudata) or a Northern form of the common Kurrajong *Brachychiton populneum* (*syn.* Sterculia diversifolia). The material in all cases has, unfortunately, from a botanical point of view, been rather scrappy. On looking closely through it, however, I have come to the opinion that all the material from the more tropical parts placed under *B. populneum* in our herbarium collections belongs to *B. diversifolium.*

The following account has been prepared primarily with the object of drawing attention to the differences between the two trees; the illustrations should make these quite clear, and further specimens of either, bearing leaves and flowers, or fruits, would be much appreciated from any North Queensland or Northern Territory readers.

Note on the Genus Brachychiton.—Brachychiton is a genus of plants confined to Australia, and includes such well-known species as the Kurrajong, Flame Tree, and Bottle Trees. Bentham, in the "Flora Australiensis," did not recognise it as a separate genus, but classed it only as a section of the very large genus *Sterculia*, the species of which to the number of about 100 are widely distributed over the tropics and subtropics of the old world. In this view he was followed by Bailey in the "Queensland Flora."

Brachychiton was founded as a distinct genus by Schott and Endlicher in 1832, and is now held by most modern botanists to be sufficiently well marked from *Sterculia* to retain full generic rank. It is readily distinguishable by the seeds having a loose, brittle outer skin (testa) covered with hairs usually of a bristle-like nature; this outer coating of the seed is more or less adhesive to the inner face of the capsule or seed-vessel, so that when this outer skin breaks the seeds fall out in their inner testa only, leaving a number of empty shells inside the capsule presenting a honeycomb appearance. The inner face of the capsule is also covered with a thick fur or bristle-like coating of hairs, usually very dense and short.

In *Sterculia* the outer skin of the seed is quite smooth and falls away with the seed; only one species of the genus *Sterculia* as thus outlined is found in Queensland—viz., *S. quadrifida.*

COMMON KURRAJONG.

(BRACHYCHITON POPULNEUM).

References.—Brachychiton populneum, R.Br., in "Benn. Pl. Jav. Rar," 234; *F. v. Mueller,* "Plants of Victoria," I. 156, *Suppl. tab.* 5; *Maiden,* "Forest Flora of New South Wales," VII. 77-83, *tab.* 236; *Sterculia diversifolia,* G. Don., Gen. Syst. I. 516; *Bentham,* "Fl. Austr.," I. 229; *F. M. Bailey,* "Queensland Flora," I. 139.

Description.—A tree 20-60 ft. high. Leaves glossy-green, glabrous, long-stalked, very variable in shape, varying from ovate to ovate-lanceolate or more or less deeply 2-5 lobed, 2-3 in. long, the leaves or their lobes ending in long points. Flowers borne in axillary panicles, broadly campanulate, closely and densely or sparsely hairy outside, up to nine lines across, but usually somewhat smaller. Seed capsules 1½-3 in.

PLATE 24.—COMMON KURRAJONG (*Brachychiton populneum*).

1, 2, and 3. Flowering branch and leaves (Eidsvold—Dr. T. L. Bancroft).

4. Seed vessels, *s* the long slender stipes; all reduced to the same scale.

Analytical details:—(*a*) flower; (*b*) male flower in section; (*c*) female flower in section; (*d*) staminal column; (*e*) pistil with a ring of abortive anthers at the base; (*f*) seed enclosed in its outer brittle covering; (*g*) seed; (*d*) and (*e*) enlarged, the rest natural size.

long, the valves thick and woody, borne on a long slender stalk or stipes. Seeds with the outer covering about ½ in. long, outer coating thin and brittle, bright yellow, clothed in the lower part with bristle-like hairs, inner coating dark brown or black but covered with a very close yellow somewhat waxy tomentum.

Distribution.—Widely distributed in Queensland; it is common in the forest country on the ranges of the south-eastern parts, such as Taylor's and Enoggera Ranges about Brisbane, Main Range, Bunya Mountains, Mistake Mountains, &c. It is very abundant in the Wide Bay, Burnett, Dawson, and Port Curtis districts. Our westernmost, and at the same time northernmost, locality represented in the Queensland Herbarium is Aramac (coll. C. W. De Burgh Birch), and specimens from localities further north or west would be much appreciated.

Besides Queensland it is found in New South Wales and Victoria.

Uses.—It is one of the principal fodder trees of Australia. It is largely grown, especially in the southern States, as an ornamental tree. The seeds have been used as a substitute for coffee. The young shoots, roots, and seeds were all used as food by the aborigines. The bark produces a strong fibre.

NORTH AUSTRALIAN KURRAJONG.

(BRACHYCHITON DIVERSIFOLIUM).

References.—Brachychiton diversifolium R. Br. in "Benn. Pl. Jav. Rar.," 234; *Ewart and Davies* "Flora of the Northern Territory," 192; *Sterculia caudata, Heward; Bentham,* "Flora Australiensis," I., 230; *F. M. Bailey,* "Queensland Flora," I., 139.

Description.—A tree, leaves glabrous, long stalked (except some of those on the barren shoots or coppice and seedling growths), variable in shape, usually ovate-cordate, but sometimes lanceolate, broadly linear, ovate or ovate-lanceolate, 2½-6 in. long. Flowers very velvety, pubescent or closely tomentose outside, borne in short axillary panicles, 5-7 lines across when fully out. Seed vessel almost sessile, or borne on a stipes not exceeding ½ in. long, 3-4 in. long, the valves hard and woody. Seeds with the outer covering ½ in. long; outer coat or testa loose, brittle, yellow and covered in the lower part with bristle-like hairs; inner coat or testa dark brown or blackish, but covered with a dense close yellow somewhat waxy tomentum.

Distribution.—This tree is apparently fairly common in North Queensland in the Cape York Peninsula and a little to the south. It also occurs in the Northern Territory and the northernmost parts of West Australia.

Specific Queensland localities for it in the Queensland Herbarium are:—Carbeen, near Mareeba (J. F. Keane); Stannary Hills (Dr. T. L. Bancroft); Cumberland (J. Williamson); Palmer River (Dr. W. E. Roth); Princess Charlotte Bay (Dr. W. E. Roth); Coen River (Mrs. R. W. Garraway).

Judging from our flowering specimens it would appear that the tree is dioecious—*i.e.*, male and female flowers borne on distinct trees, but this could only be settled by an examination of numerous trees and their flowers.

Uses.—In "North Queensland Ethnography," Bulletin No. 3 (Brisbane 1901), Dr. W. E. Roth states that the fruits (seed vessels) are roasted and eaten by the natives. In Bulletin No. 7 (Brisbane, 1904), he states that on the Palmer River dilly bags are woven from fibre obtained from the bark. (He refers to it as the common southern tree, but I have seen his specimens, and they undoubtedly belong more to *B. diversifolium*). It would, no doubt, have similar value as a fodder tree as the common Kurrajong of Central and Southern Queensland, of New South Wales, and Victoria.

Main Distinctions Between the Two Species.—The differences between the two species can be put briefly, as follows:—

B. populneum (Common Kurrajong): Leaves entire or deeply lobed. Flowers almost glabrous or densely and closely tomentose outside. Staminal column quite glabrous. Follicles (seed vessels) 1½-3 in. long, on a long slender stipes or foot-stalk up to 3½ in. long, but usually somewhat shorter.

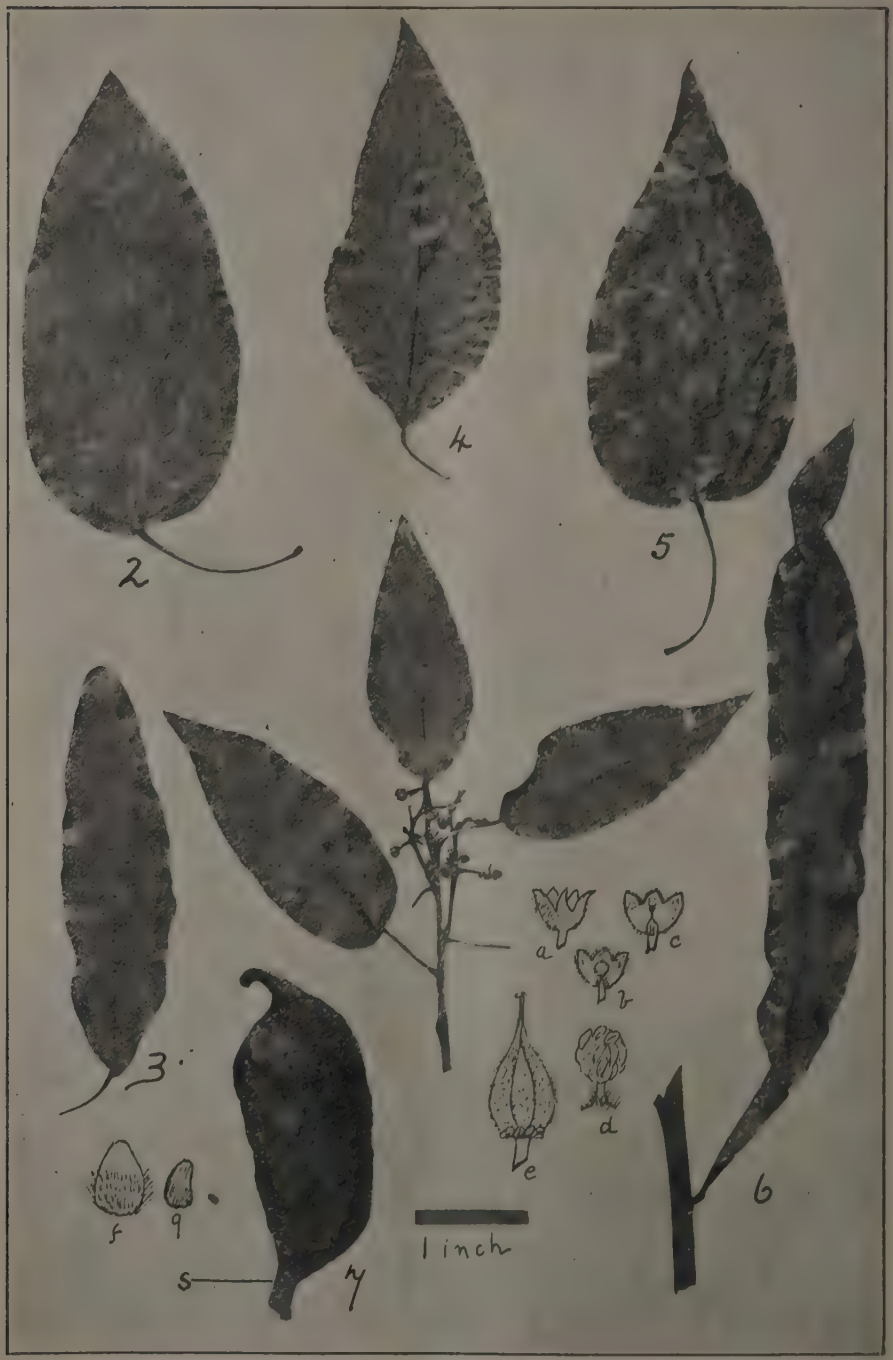


PLATE 25.—NORTH AUSTRALIAN KURRAJONG (*Brachychiton diversifolium*).

1. Flowering branchlet (Stannary Hills). 2. and 3. Leaves (Carbeen, near Mareeba). 4. Leaf (Cumberland). 5. Leaf (Princess Charlotte Bay). 6. Leaf from coppice growth (Palmer River). 7. Seed vessel, s. the short stout stipels. All reduced to the same scale.

Analytical details—(*a*) flower; (*b*) male flower in section; (*c*) female flower in section; (*d*) staminal column; (*e*) pistil; (*f*) seed enclosed in its outer coat; (*g*) seed; (*d* and *e*) enlarged; the rest, natural size.

B. diversifolium (North Australian Kurrajong): Leaves entire. Flowers densely and closely tomentose outside. Staminal column hairy at the base. Follicles (seed vessels) 3-4 in. long, almost sessile or on a stipes not exceeding ½ in.

NOTE.—Ewart and Davies in "The Flora of the Northern Territory," p. 192, record *B. populneum* from several localities in the Northern Territory, and Maiden, in his "Forest Flora of New South Wales," vol. VII., page 82, records it from the Stewart River, in the Cape York Peninsula, Northern Queensland. It is quite possible, however, that the two trees here dealt with have been confused in the National Herbaria of Melbourne and Sydney, as they have been in Brisbane in the past, and that these tropical specimens are referable to *B. diversifolium*, which stretches, practically speaking, across the whole of Northern Australia.

Ewart and Davies l.c. give the vernacular name of *B. diversifolium* in the Northern Territory as "Flame Tree." Where the application of this name comes in it is hard to say; its use for this species is to be strongly discouraged, as the vernacular is almost universally applied in Australia to *B. acerifolium*, a native of the rich coastal "scrubs" or "brushes" of Queensland and New South Wales. This latter species is called "Flame Tree" on account of its bright scarlet or blood-red flowers, which it produces in great profusion from November to January.

INQUIRY RE SUITABILITY OF BLACK BEAN SEEDS FOR STOCK FOOD.

In reply to a correspondent, Mr. C. T. White, F.L.S., Government Botanist, writes:—

The large brown seeds of the Black Bean, Bean tree or Moreton Bay Chestnut (*Castanospermum australe*) are not suitable for stock food. When eaten by stock in any quantity they cause severe griping and often death, due to the presence in the seed of a poisonous saponin.

It is true the natives used them as food in the early days, but went to considerable trouble to rid the seeds of the poisonous principle; they were first baked or steamed, then finely grated, placed in dilly bags, and left in a swiftly running stream for about forty-eight hours before eating.

Considering the risk of using them, however, it would be hardly worth the trouble of thus preparing them for stock food, as there is even then, especially with an animal like the pig, a fair chance of them proving harmful.

THE PRICKLY POPPY.

In replying to a letter received by the Department of Agriculture from a correspondent at Gladstone, asking for information concerning the Prickly Poppy, which he said was becoming a great nuisance in one part of the Calliope Shire, Mr. C. T. White, Government Botanist, stated that the plant is an annual, mainly a summer weed, though it may persist throughout the whole year. No easy method of eradication is known. Spraying with an arsenical weed killer should prove effective where the plants are growing thickly together, but the danger of animals being poisoned has to be taken into consideration. The young plants should be chipped out before reaching the seeding stage. Now is a good time to attack them as seedlings are very abundant about this time of the year (November). As cases are on record in Queensland of cattle eating the wilted plants after the weed has been cut down, they should be gathered together and burnt as soon as possible, as the plant is a poisonous one.

The Agricultural Chemist recommends the following as a suitable spray:—

"Half a pound of arsenic dissolved by means of ¼ lb. of caustic soda in 2 gallons of water, and this solution then diluted to 10 gallons with water."

Apiculture.

THE CAUSES OF THE PERIODICAL RETROGRESSION OF THE BEEKEEPING INDUSTRY IN AUSTRALIA.

FLUCTUATIONS IN PRODUCTION.

The Beekeeping Statistics of the last twenty years show some striking fluctuations in the number of hives of bees, the amount of honey and beeswax produced, and the average yield of honey per hive. Taking the last six years as an illustration we have the following figures:—

BEEKEEPING STATISTICS, 1914-19.

	Number of —		Honey Produced.		Wax Produced.	
Year.	Beekeepers.	Hives.	In lb.	Average per hive.	In lb.	Average per hive.
1914 ..	5,643	55,565	1,961,746	35 lb.	37,323	11 oz.
1915 ..	2,639	35,015	700,672	20 „	20,017	9 „
1916 ..	3,633	31,233	933,933	30 „	18,707	9½ „
1917 ..	3,661	36,561	1,547,023	42 „	22,131	9½ „
1918 ..	4,427	58,346	4,974,888	85 „	46,980	12½ „
1919 ..	4,374	52,782	1,644,447	31 „	25,286	7½ „

It is feared that the 1920 figures will reveal a further sharp decline.

The setbacks shown by the above table are due to two causes—

(1) The absence of flowering herbaceous plants caused by drought;

(2) The non-flowering of pollen-yielding Eucalypts.

In either case, reproduction during the working season ceases because the bees are unable to secure the necessary nitrogenous food, while the adult bees wear out in the natural course.

So far, the pollen substitutes to which beekeepers in Europe and America have recourse, during very brief periods of dearth, have proved unsatisfactory in Australia, the young bees reared on these substances (rye meal, pea meal, and flour) being weak and short-lived.

It will be seen from the table that, concurrent with the loss of hives, there is a pronounced reduction in the average yield per hive. This is accounted for by the small number of bees left in the surviving hives.

A suitable substitute for pollen, or some other means of supplying bees with the indispensable proteids, would be of immense value by preventing the periodical losses of thousands of bee colonies and the decrease in the production of honey and beeswax.

PECULIARITIES OF HONEY FLORA.

Under normal conditions bees obtain most of their pollen supply from the flowers of our native flora—Eucalypts, Banksias, Acacias, &c. Eucalypts, which are one of the main sources of pollen, are but little affected by a shortage in the rainfall, and if they flowered regularly—annually, like the flora of Europe—there would be no dearth of pollen. Most of the gum, however, flower only every second year, some every third, or even fourth year only; and, strange to say, all the trees of any particular species flower in the same year. So that, in the "off" year, there is no bloom and no pollen.

NON-POLLEN-YIELDING FLOWERS.

Some of the best nectar-bearing species, such as *Eucalyptus melliodora* (yellow box), *E. leucoxylon* (yellow gum), *E. polyanthemos* (red box), and *E. sideroxylon* (red ironbark), furnish no pollen for bees; although it must be assumed that their flowers, like all others, produce pollen. When, during the flowering of these trees, bees are unable to collect pollen from other sources, the colonies rapidly dwindle, owing to partially or entirely suspended brood rearing. When this occurs during a summer honey flow (such as from yellow box), extending over three months, not only is a large portion of the crop lost to the apiarist owing to the weakened condition of

the colonies, but, when an autumn follows (grey box, *E. hemiphloia* or stringybark, *E. macrorrhyncha*) this may be entirely lost. The bees recover, but too late to produce more than enough for their own needs. In the case of a honey flow from *E. leucoxylon* or *E. sideroxylon* late in autumn—neither of them pollen-yielding—the bees will often dwindle away entirely.

The apiarist can cope with a shortage of honey by feeding sugar syrup, but during a dearth of pollen he is helpless to prevent the gradual disappearance of his stocks.

Dark Honeys.

Australia produces, perhaps, a greater number of varieties of honey than any of the other continents. Some of these honeys are rather dark, although quite equal in flavour and food value to the paler kinds. Owing to the modern craze of judging even articles of food almost solely by appearance, these darker honeys are hard to dispose of, especially in oversea markets, and then only at a greatly lowered price. If some method could be discovered for reducing the colour of this honey to a paler hue, and at the same time removing the excessive aroma of certain kinds, it would add immensely to the value of honey production. Further, it would enable the industry to operate on some of the best honey resources available, but now avoided on account of the colour of the honey.—"Victorian Bee Journal."

ERADICATION OF SORREL.

Replying to a correspondent at the Soldiers' Settlement, Amiens, on the subject of this weed, Mr. C. T. White, F.L.S., Government Botanist, gives the following information thereon and the steps to be taken for its eradication:—

Sorrel (*Rumex acetosella*) is a great deal more troublesome in the Southern States than in Queensland, where it only occurs in great abundance in the cooler parts.

It usually only grows sufficiently well to be a nuisance on lands that are acid. This acid condition of the soil should be corrected by heavy applications of lime. In South Australia, where the weed is abundant, W. J. Spafford, Director of Experimental Work, states that in practice a good way to overcome this difficulty is by an application of at least 5 cwt. of lime per acre at least every alternate year; "but," he continues, "it must be remembered that, with a small application like this, its effects on sorrel are not noticeable until the second year after applying. In a case in which one desires to rid the land of sorrel for the next year's crop, it would take an application of about 2 tons of lime per acre to have any effect on it."

The abovenamed applications of lime are somewhat expensive in comparatively poor soils, and a more practical way to deal with the acidity of soils in a district, and the sorrel growing in them, would be wrapped up with cultivation and manuring. The thorough exposure of such soils will lead in time to their sweetening, and the cultivation necessary to give this exposure will directly kill the sorrel growing there. Bare fallow, in conditions existing in such districts, should receive at least three cultivations of some kind between ploughing and the cultivation preparing for seeding operations. In years during which the sorrel is plentiful, this may have to be increased, as it is desirable to rip up the plants, to be exposed to the drying atmosphere, every time they make their appearance. It has been proved by experience that, in soils at all likely to become acid, repeated applications of superphosphate tend to make them become more acid, so that, in cases in which heavy applications of lime are hardly warranted, superphosphate should be used as little as possible. I would suggest as manurings for cereals on such lands (1) ¼ cwt. superphosphate and 1 cwt. finely ground raw rock phosphate per acre, or (2) ½ cwt. superphosphate and 2 cwt. agricultural lime per acre. The first mixture will be much the cheaper of the two. However, care must be taken to secure very finely ground rock phosphate. The superphosphate and lime will check the sorrel sooner than the other dressing, but will be dearer and more difficult to apply.'

Ada E. Georgia, in "Manual of Weeds," gives the following advice:—

"Cultivate and enrich the ground, correcting its acid condition with heavy applications of lime. Grain crops infested are so robbed of moisture as to yield very poor returns; they may be helped by a spray of iron sulphate applied just as the weed comes into bloom; the rootstocks take no harm, but much of the leaf surface is destroyed, and seed development prevented for that season. Give surface cultivation after harvest, exposing the fibrous rootstocks and destroying the leaf growth, and also stirring dormant seeds into life. Reseed heavily, smothering the weed with strong grasses or clover."

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF OCTOBER IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING OCTOBER, 1920 AND 1919, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	Oct.	No. of Years' Records.	Oct., 1920.	Oct., 1919.		Oct.	No. of Years' Records.	Oct., 1920.	Oct., 1919.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	0·88	19	1·39	0·43	Nambour	3·03	24	7·29	0·51
Cairns	1·98	38	1·31	0·18	Nanango	2·34	38	2·66	0·73
Cardwell	1·93	48	5·75	0·06	Rockhampton ...	1·80	33	4·19	1·58
Cooktown	1·12	44	1·90	0·15	Woodford	2·63	33	3·12	1·06
Herberton	0·89	33	1·33	0·06					
Ingham	1·49	28	2·39	Nil					
Innisfail	3·54	39	3·16	0·22					
Mossman	3·17	12	...	0·14	*Darling Downs.*				
Townsville	1·19	49	1·23	Nil					
					Dalby	2·11	50	2·64	0·87
Central Coast.					Emu Vale	2·33	24	2·79	0·54
					Jimbour	1·86	32	2·62	0.36
Ayr	0·87	33	3·42	0·01	Miles	1·97	35	3·27	0·17
Bowen	1·03	49	0·92	Nil	Stanthorpe ...	2·60	47	2·07	0·69
Charters Towers ...	0·65	38	0·68	Nil	Toowoomba ...	2·66	48	3·82	0·50
Mackay	1·86	49	2·82	0·06	Warwick	2·24	33	2·52	0·38
Proserpine	1·70	17	2·46	0·12					
St. Lawrence ...	1·84	49	3·58	0·42	*Maranoa.*				
					Roma	1·71	46	3·43	0·09
South Coast.									
					State Farms, &c.				
Biggenden	2·16	21	5·45	0·65					
Bundaberg	2·14	37	3·27	2·28	Bungeworgorai ...	1·03	6	3·04	0·06
Brisbane	2·64	69	2·16	0·86	Gatton College ...	2·25	21	3·68	0·66
Childers	2·25	25	9·27	4·71	Gindie	1·22	21	5·97	Nil
Crohamhurst ...	3·57	25	8·14	0·71	Hermitage ...	1·89	14	2·95	0·51
Esk	2·37	33	5·86	1·15	Kairi	1·03	6	1.27	Nil
Gayndah	2·39	49	5·17	1·42	Sugar Experiment				
Gympie	2·72	50	4·81	2·16	Station, Mackay	1·69	23	2·15	0·01
Glasshouse M'tains	2·69	12	...	0·71	Warren	2·37	6	5·46	2·48
Kilkivan	2·66	41	3·77	1·34					
Maryborough ...	2·74	49	4·25	2·92					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for October this year, and for the same period of 1919, having been compiled from telegraphic reports are subject to revision.

GEORGE G. BOND, State Meteorologist.

Plant Pathology.

THE ROOT DISEASE OF THE BANANA IN NORTH QUEENSLAND.

By J. F. ILLINGWORTH.

During 1917 I received a communication from the Department requesting me to make an investigation of this trouble in the banana gardens of the Cairns district. Hence, in company with Mr. G. Williams, Fruit Inspector, located in Cairns at the time, I immediately made a survey of the affected Chinese gardens in the Freshwater area.

Most distressing conditions were at once apparent. None of the banana plants were making healthy growth—even the Cavendish (*Musa chinensis*), which is usually more or less immune to disease, appeared to be drought-stricken. All of the lower leaves were either dead or dying, the rest of the top lacking the usual healthy green colour, and the bunches were very much dwarfed. In fact, conditions were so bad that most of the growers were fast going out of bananas—planting their land to pineapples and citrus fruits.

Digging the plants, we found that most of the feeding rootlets were dead or rotted off (see figs. 1 and 2), while even the larger roots showed decay in patches, particularly at the points where the rootlets had disappeared. The surface of the corm, too, had brown areas, where the disease had worked up to it from the dying roots. There was every indication of a fungus trouble; still I was at a loss to account for the fact that the disease was equally virulent on all classes of soil. I thought, at first, that it might have a relation to drainage, but I soon found that, even on the dry sandy-loam of hillsides, the plants were no better, for here some stools had actually toppled out of the ground for want of roots.

Abundance of fresh material was collected for a microscopic study, and I proceeded at once with this to the laboratory. Selecting some of these roots which were devoid of rootlets and roothairs (see figs. 1 and 2), I made numerous thin cross-sections, cutting through the darkened areas where the rootlets had rotted off. Examination of these sections under the compound microscope revealed myriads of Nematode worms (see fig. 5), especially at the point of contact of diseased and sound tissue. Furthermore, I found these organisms in all conditions—eggs, nymphs, and the adults, fully developed. Strange to relate, there was little indication of fungus present, the few pieces of mycelium observed being evidently saprophytic and connected with the decaying tissue. I was unable to locate either mycelium or spores in connection with the living tissue of the roots. Hence I do not consider the disease in any way due to fungus.

DESCRIPTION OF THE PEST.

Tylenchus sp. (see figs. 3 and 4).

Though these worms are very different in form from the ordinary, well-known, gall forming Nematodes, never having the tremendous enlargement common to the females of *Heterodera radicola*, I feel confident that they are the cause of the distress. Furthermore, Dr. Cobb* has described a species in Hawaii, which does very similar damage to the roots of sugar-cane.

It is not surprising that these organisms have not been discovered here before, since there is no enlargement of the roots, and after the material is preserved, it is a very difficult matter to locate these tiny, slender pests. Moreover, it is mainly the activity of their movements in the tissue that makes them visible.

* Hawaiian Sugar Planter's Assn., Bul. No. 6, Div. Path. and Physiol., p. 63.

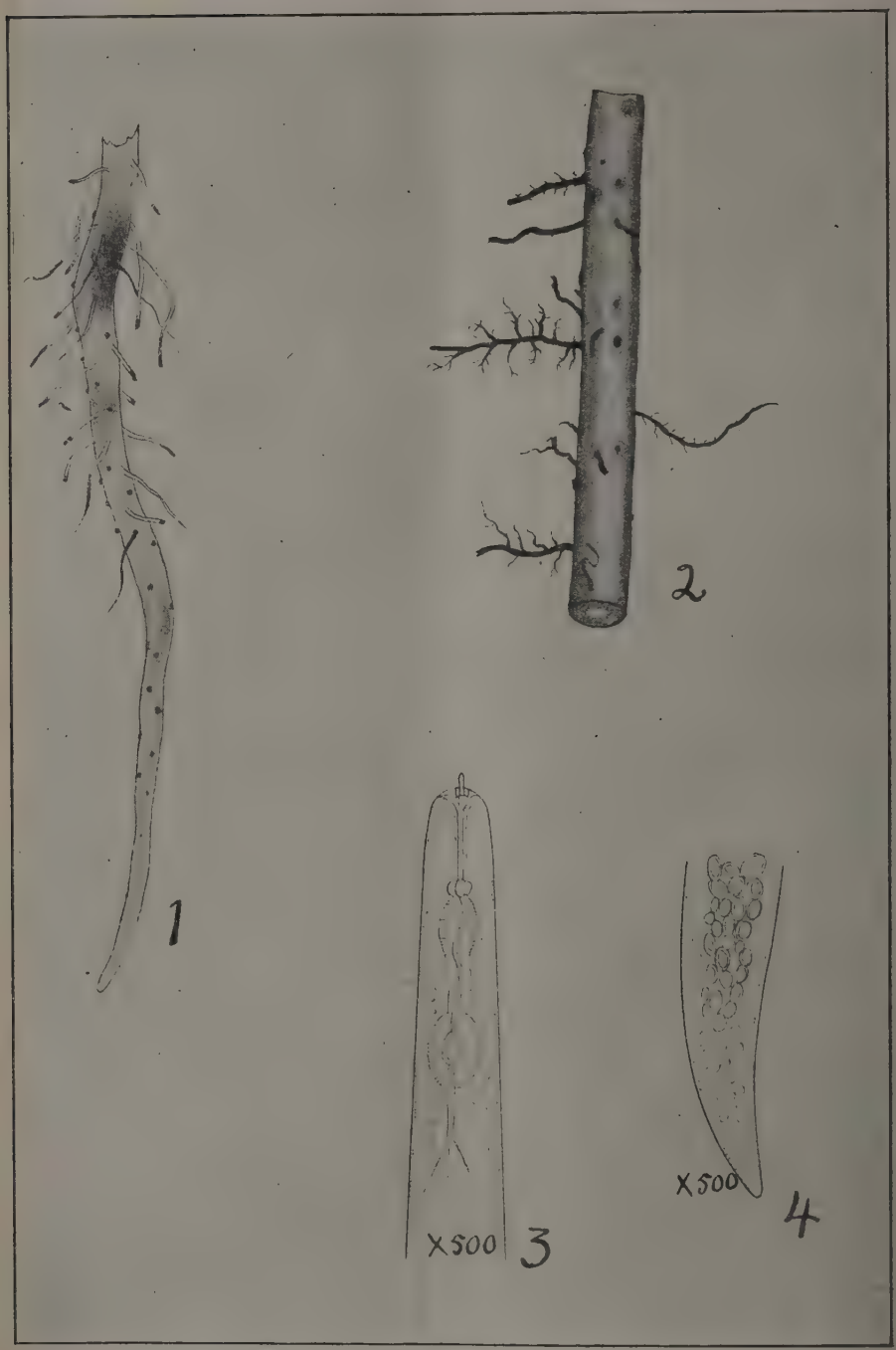


PLATE 26.

FIG. 1.—Terminal portion of root of banana, natural size, showing typical injury caused by the nematode worm, *Tylenchus sp.* The black spots are where the feeding-roots have been eaten off by the worms before entering the tissue of the main root.

FIG. 2.—A portion of an older root, natural size, showing the same characteristic injury.

FIG. 3.—Head end of the worm, magnified 500 diameters. Note the spear at the mouth, with which the plant-tissue is broken down.

FIG. 4.—Tail portion of the same worm.

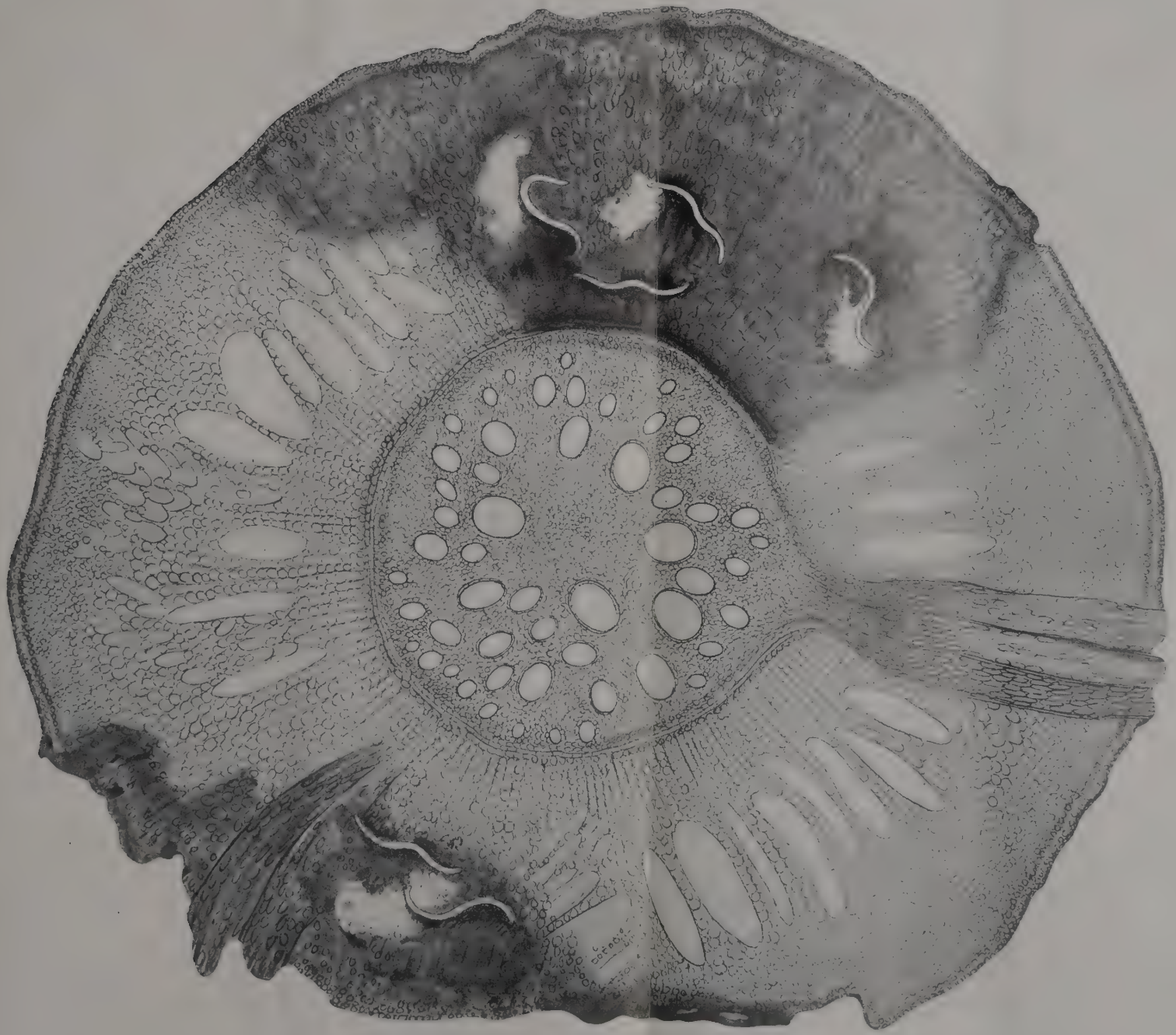


PLATE 27.

FIG. 5.—Cross section of the root shown in Fig. 1, cut through one of the blackened spots. The worms entering through the rootlets feed principally upon the parenchyma. The infested tissue becomes red, changing to purple, then brown, and finally black, where exposed to the air.

CONTROL MEASURES.

Ordinarily Nematodes are considered most difficult pests to control. I am pleased, however, to note that recent investigations* by Mr. A. H. Benson, Director of Fruit Culture, give promise of results for eelworms in general. He states:—

"Some two years ago I decided to test the effect of dipping banana plants, prior to planting, in a 1 in 1,000 solution of corrosive sublimate, which I had previously found beneficial in the case of potatoes and for destroying earth worms; so thought it possible it would be found of value in the case of bananas.

"A number of strong suckers were, therefore, obtained, and all roots and loose matter were removed from the bulbs, and they were then placed in a solution of corrosive sublimate, made by dissolving 1 oz. of this material in 6 gallons of water, the result being a solution of 1 in 960. They were allowed to remain in the solution for two hours, and then planted; and no injury was done, even though they were allowed to remain in the solution much longer.

"The suckers, when so treated, were planted at different depths—viz., 12 inches, 18 inches, and 2 feet—in volcanic soil of fairly heavy texture; and all came away without any loss, those planted at 12 inches making the earliest start and eventually producing the best plants as well as developing the most suckers. So far, no nematodes have been discovered on the roots of any of the treated plants, irrespective of the depth of planting."

Since arsenic (arsenious acid) is proving so effective for the destruction of white grubs in the soil, and since this poison has not shown any detrimental effects upon the root-system of sugar-cane, it may prove of value for other root-destroying organisms. It certainly would be well to try it. This should be done by dusting the corms, and the soil in the holes where they are planted, with the dry arsenic; also, by mixing the poison with the soil in infested fields, before putting in the sets.

Lime, too, may have some value, and should be tried out thoroughly when planting.

THE WORLD'S WHEAT: A FORECAST.

Sir James Wilson, K.C.S.I., who at one time was delegate for Britain and the Dominions at the International Institute of Agriculture, Rome, is a recognised authority on the economics of crop production, and we are in receipt of an exhaustive review by him on the position of the world's wheat supply. In summarising the various statements and estimates set out in his review, Sir James comes to the interesting conclusion that all the exporting countries of the world, which on the pre-war average exported 170,000,000 quintals (10 quintals are approximately equal to 1 ton), are likely to be able to spare for export during the year ending July, 1921, something like 276,000,000 quintals, while, on the other hand, the importing countries of the world may not require to import more than 150,000,000 quintals, leaving a surplus in the exporting countries of 126,000,000 quintals of old wheat. He is further of opinion that even if India, Roumania, and Russia export no wheat during the year ending with July, 1921, the other exporting countries will probably meet all the requirements of importing countries until then, and yet have a surplus of 38,000,000 quintals on the 1st August, 1921.—Journal of the Department of Agriculture of South Africa.

* Qsld. Ann. Rept. Dept. Agri. and Stock, 1919, p. 51.

Entomology.

CANE GRUB INVESTIGATION.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon Cane Grub Investigation, from the Entomologist, Dr. J. F. Illingworth:—

Weather conditions could not have been better for growing cane; light showers have continued throughout the dry season, and both the young plants and the ratoons give promise of an excellent crop. Furthermore, these favourable climatic conditions have done much to stimulate diseases among the grubs, so there is every prospect of a considerable diminution in these pests.

As indicated in former reports, the beetles were very erratic in their flight last season, and they missed many areas altogether that have regularly been infested in former years. This fortunately was the case in the Innisfail district—the crop, being practically free from grubs, has cut splendidly. A few places, however, like Greenhills, in the Cairns district, have never had a worse year. Early in the season the estimate for that estate was about 12,000 tons, but the grub-injury became so widespread that practically all the fields were affected, and hundreds of acres were a total loss. It is distressing to report that only 2,400 tons could be harvested; and most of this was very short and light, so that it hardly paid for cutting in many instances.

Fortunately, nature is now lending us a hand in these devastated areas; not only have the grubs been practically wiped out in places by fungus and bacterial diseases, but on top of this we find that the parasitic wasps, *Campsomeris* sp., were never more abundant; the males are flying about over the surface of the ground in thousands, thus indicating that their mates are numerous below searching out the grubs. Apparently these wasps have multiplied exceedingly during the past few months; and, undoubtedly they are kept in the infested area by the abundance of flowering weeds which are now growing on the fields thrown out of cultivation. Chief among these, the wasps appear to favour the Chinese burr, which has nectaries on the petioles as well as those in the flowers. Early in the morning, before the sun is hot, the female wasps are to be seen on these plants in great numbers. The males I have often found clustered together roosting on weeds at evening, when the weather is damp and cool. Under such conditions it is possible to gather a handful in one spot—male wasps are said to have no sting, but I found that these fellows were able to pierce the skin with the three prongs borne on the terminal segment of the abdomen, and apparently, they produce some poison, for there is a very strong odour of formic acid; at any rate, the feeling was not very comfortable where they punctured my fingers.

During this off season for the grubs, a number of other pests have continued troublesome, chief among these I might mention cutworms, grasshoppers, and the linear bugs.

ARSENIC FOR CANE GRUBS.

It is very satisfactory to report that the cane is making most excellent growth in all of the plots treated with arsenic, and especially in the plot where the poison was applied at the rate of 200 lb. per acre, which was done to see if a heavy dressing of arsenic would in any way hinder growth.

During the past few months I have experienced considerable difficulty with white grubs in the garden. In preparing the soil for cucumbers, &c., I worked fresh cow dung thoroughly into each hill, covering with soft earth. By this treatment the cucumbers invariably failed, the vines yellowing and drying up before the fruit was produced. I found that the soil was full of grubs, attracted by the manure, and they had evidently eaten all the roots from the plants. These were mostly the larvæ of *Isodom punæticollis*, Macleay, which must be very rapid in development, for no grubs were in the soil when the hills were prepared a few weeks previously.

I tried arsenic in this case as a control measure, with excellent results. Hills in which the grubs were present in all stages were dusted with the poison at the rate of about 80 lb. per acre, and this was worked well into the soil. A fortnight later practically all the grubs had disappeared in the treated hills, though but very few of the blackened dead ones were seen; probably the others were removed by ants, which were abundant in the hills. Also, it was observed that there was no diminution in the number of grubs in the untreated hills.

It will probably be found best to apply the poison to the manure when preparing the hills for planting, similar to the placing of the arsenic in the drill with cane plants.

CUTWORMS.

The Army-worm, *Cirphis unipuncta*, Haw., has continued to give trouble in various sections. They are often destructive to young corn, and appear to prefer ratoon cane, just as it is beginning to shoot out. Though this pest has a number of excellent parasites, it often gets away from them for some reason, and does a lot of mischief.

Recently I experienced a serious outbreak at Malanda, on the Tableland, where the caterpillars were in such numbers that they spread from a grass paddock, which they practically killed out, right through a field of oats, stripping it to stubble, and ending up in a field of young corn, which was eaten off to the ground level before the army was ready to pupate. In this case no parasites were in evidence.

GRASSHOPPERS.

Some time ago I called attention to a plague of grasshoppers (*Locusta australis*, Brunner) at Meringa. Evidently what were left of that flight produced well, for recently young hoppers came forth in extreme numbers. They travelled like a flock of sheep in one general direction, and wherever they camped to feed, the vegetation was eaten to the midribs. In the last nymphal stage, which they had reached when my attention was called to them, they were stripping the leaves of even the old cane, and playing havoc with the young plant.

I at once set about to control them, lest, if they were permitted to reach the winged stage, they might possibly fly more widely and prove a serious menace.

I made several lots of a poisoned bait, using the formula which proved so successful in Kansas:—

Bran	20	lb.
White arsenic	1	lb.
Molasses	2	qts.
Lemons	3	
Water	3½	gals.

The arsenic was mixed with the bran dry; the lemons were then minced in the meat-grinder and added with the molasses and water, stirring so as to dampen the mash thoroughly. It was found that the oil from the rind of the lemons greatly increased the attractiveness of the bait.

The mash was sown broadcast, as advocated, in strips through the infested area. I found it very satisfactory to sow it only in every third or fourth centre between the cane rows, for the young hoppers quickly crawl to the treated strips.

Sown broadcast, the particles are so small that there is little danger of poisoning birds or poultry, and the greatest number of insects will get it in the shortest time.

The results were most remarkable, for even the winged insects were found eating the bait upon the ground. About four hours after treatment I examined the field and found many sick hoppers, which had already crawled under the stools of cane, where they were too weak to get out of the way. Next day the dead hoppers were everywhere, especially under the stools or any trash that happened to be lying about.

It was practically a clean sweep of both young and adults. I was surprised that the winged insects could be handled so effectively, especially since the cane was standing, and there was an abundance of green feed everywhere about.

LINEAR BUGS.

These sucking insects, *Phaenacantha australica*, Kirk., continue to be exceedingly abundant in widely-separated localities. They certainly do a lot of damage by removing so much sap from the mature plant. Naturally this must draw seriously upon the stored sugar in the cane.

I have never seen these bugs more abundant than I found them in the vicinity of the South Johnstone Experiment Station. The cane adjoining the scrub simply swarmed with them—hundreds sometimes beneath a single leaf, and all with their beaks inserted. Is it any wonder that the leaves turn yellow and die back from the tips?

While studying the death-factors of these insects, I found that the adjoining scrub was literally full of the adults. They were roosting all over the vegetation, apparently without regard to the kind of plant. In the cane a good many were caught in spider-webs, and a few were destroyed by the larger Reduviid bugs, which are regularly predaceous in their habits. The worst enemy that I was able to discover was the ant, *Pheidole megacephala*, which destroys many of them when they are down in the grass on dark wet days.

Undoubtedly many of the eggs are parasitised or eaten by predators, but they are so small and difficult to locate, that this phase of the problem requires considerably more investigation.

BEETLE BORER.

Fortunately these insects are not so abundant this season, though they are gradually becoming more widely spread. The Innisfail district has not suffered this season as much as usual, for some reason. Yet this immunity cannot be due to the parasites, for I was unable to find any trace of the flies that have been liberated there from time to time. I discovered on my recent trip that wherever the signs of the borers were particularly noticeable the ants had taken possession of their runs, cleaning out the grass and destroying most of the grubs. During wet weather these valuable predators must effect a material reduction of the pest. It is a well-known fact that ants must get out of the saturated soil with their brood, and the borer runs are ideal habitations when cleared of the grass. Apparently they find it difficult to dislodge the borer, however, once he has formed his cocoon, which is a mass of compactly woven cane fibres.

Standover cane from Mount Sophia showed the greatest damage from borers this season, hence we have recently liberated a considerable colony of the parasites in a near-by field where the cane is to be cut late, so as to give the flies a chance to get started.

SUGAR-CANE LEAFHOPPERS ON THE TABLELAND.

I was interested while examining the cane growing at Malanda and at the State Farm, Kairi, to note that leafhoppers were more abundant than at lower elevations. This coincides with observations in Hawaii, where the pest gives considerably more trouble in the elevated areas, since the egg-parasites are not so effective under lowered temperature.

The cane was rather yellow and stunted, not having the dark green colour and the vigour common to the lowlands; still this may have been due to the continued drought, for all the surrounding pastures were dry and brown.

In several instances I found leafhoppers dead and sticking to the leaves, where they had succumbed to some kind of a fungus disease.

HELPING THE HOSPITALS.

"Over fifty flockmasters in Rothbury (Northumberland) district, have," says the London "Live Stock Journal" for September, 1920, "decided to give a sheep each, annually, to be sold on behalf of the Newcastle Infirmary." This generosity on the part of British farmers might be emulated by Queensland "flockmasters," who own tens of thousands more sheep than all the farmers in every county of the United Kingdom, and not a grazier would miss one or two sheep so donated annually.

General Notes.

SILVER WATTLE GUM.

OBTAINED FROM *ACACIA RIVALIS*.

The "Journal of Agriculture" of South Australia (October, 1920) contains the following interesting article on the Silver Wattle Tree, and its commercial value as a producer of gum, contributed by H. W. Andrew, Botanical Assistant, &c.:—

For upwards of thirty years a comparatively little known industry, the gathering of the so-called "silver wattle" gum, has been established in the Flinders Range over a narrow strip of country extending roughly between Mooloolloo, Blinman, and Hawker.

Although this acacia has thus been known commercially for a good number of years, no previous record in Australian literature is to be found as to the distribution or botanical name of the tree from which the gum is derived. This is accounted for by the rather remarkable fact that the tree has only been known botanically since 1918. The following details, therefore, are deemed worthy of placing on record.

DISTRIBUTION.

When in the Blinman district last August I made inquiries concerning the tree from which this gum is collected. About 2 miles east of the Blinman township trees were seen growing, from which the "silver wattle" gum was collected by local people each year. A few days later, at Mooloolloo Station, about 9 miles from Blinman, I again came across the tree, where it appeared to be fairly plentiful. Here also it received the same name, "silver wattle," and the manager of the Mooloolloo Station confirmed the statement made to me by others, viz., that this was the tree from which the local "silver wattle" gum is secured. On examination the tree proved to be *Acacia rivalis*, J. M. Black. This species was first described and recorded by Mr. Black, who was not aware of its economic value, in the "Transactions of the Royal Society of South Australia," vol xlii., year 1918, from specimens found growing in the bed of a creek near Hawker in October, 1917. A note in that journal states that a specimen was submitted to Mr. J. H. Maiden, the leading authority on Australian acacias, who agreed that it was probably a new species, and further that "its affinity appears to be with *A. leprosa*, Sieb., var. *tenuifolia*, Benth., in the flowers and bracts, and with the narrow forms of *A. stricta*, Willd., in the phyllodes and general appearance, but the flowers and pods are totally different. The pods are a good deal like those of *A. calamifolia* and its allies. Without flowers and pods it could easily be mistaken for *A. aestivalis*, Pritzel, a Western Australian species."

The Gum.—From a number of inquiries made concerning this gum it was ascertained the minimum quantity produced and sold this year was 6 tons, the wholesale price paid for which was approximately 70s. per cwt. One firm put down the production this year at 10-14 tons.

Supplies chiefly come from the Blinman district, and appear to be bought up largely from the pickers by local storekeepers, and ultimately sent to Adelaide. Production varies very much according to the climatic conditions of the gumming season, which usually begins about January; 4-14 tons are said to be produced annually.

Commercial lots of this year's gum actually examined in Adelaide very much resemble in appearance gum arabic obtained from *Acacaia senegal*, varying from

light yellow to a cherry red, and beautifully frosted on the surface, the pellets of gum ranging in size from that of a small marble to a medium-sized apple. Another local trade name for the gum is "first light grade gum."

So far I have been unable to ascertain definitely the use to which this gum is put, or the ultimate destination of main supplies. Doubtless it is used frequently as a substitute for gum arabic, though it was said to be unsuitable in the manufacturing of jujubes. Before the war most of it seems to have gone to Germany, and subsequently much of it was disposed of in Australia.

Although I did not traverse the whole of the district where this wattle is growing, still I could not help being struck with the marked absence of young trees over the country covered; rabbits and stock, no doubt, both play a rôle in reducing the area of this very useful native tree.

The fact that this plant, though known commercially for so many years, was not described botanically at an earlier date is a striking commentary on work done with our useful native plants. The definite mapping out of the region covered by this tree, which appears to be peculiar to this part of Australia, one would think might be undertaken with advantage.

HOW THE BLIND CAN READ.

Arrangements have been made with a British firm to manufacture the Optophone, a wonderful instrument which enables the blind to read ordinary type. This instrument, which was recently perfected by the inventor, depends for its action on the peculiar properties of selenium. This metal changes its electrical resistance under the influence of light. In the Optophone five minute beams of light fall upon the printed letters and are reflected on to a selenium cell which forms part of a telephone circuit. The blind operator sits with the telephone receiver to his ear and moves the line of type along. Each letter, according to its shape, alters the current in the telephone circuit in a particular way, giving a characteristic change of sound. By this means the blind can spell out the words.—"Industrial Publicity Service," London.

HOW FORESTRY INCREASES THE FARM INCOME.

In the issue of the Journal for June, 1920, and in several previous numbers, we have pointed out how the planting of timber trees could be a source of revenue to farmers, without affecting their main industry—but proving an aid to it, in the way of break winds affording shelter to orchards, vineyards, &c., and, furthermore, supplying much of the timber required for fencing, for stockyards, and various other purposes.

In one of our late exchanges, we found the following reasons for the planting of trees on farms, without any diminution of the areas devoted to crops. These are:—

1. Making waste lands yield a profit by growing timber on poor soils, steep slopes, rocky lands, wet lands, unused corners, gullied or eroded lands.

2. Furnishing paying employment for men and teams during the winter.

3. Utilising timber better on the farm and avoiding waste by cutting low stumps and small tops, using substitute woods in construction, treating nondasting woods.

4. Increasing crop yields by planting forest tree windbreaks.

5. Growing more and better timber on the farm through protecting the woods from fire and overgrazing; selecting for cutting the mature, defective, overcrowded, and inferior kinds of trees, and leaving the straight, thrifty, and better kinds; planting to fill up openings in woodlands.

6. Marketing the higher grades of wood products direct to consumers at fair prices in the form of saw logs, poles, piling, cooperage bolts, handle bolts, posts, pulp wood, firewood, spoke blocks, tannin wood and bark.

The forest lands held by farmers in the Southern States (U.S.A.) constitute a total of about 124,000,000 acres, which is more than one third (35 per cent.) of all the farm lands of that section. These farm woodlands represent more than one half of the entire forest land in the Southern States, and nearly one half is sold in the form of logs, other cut products, and as standing timber. The remainder is used on the farm.

FLAX-GROWING.

The Perth "Farmer," W.A., 5th November, stated that during the previous week, "The Minister for Trade and Customs (Mr. Massey Greene) announced that the Government had guaranteed £6 a ton for standard flax grown during the season 1921. There appeared to be every prospect of the price of flax fibre remaining at a high level for some time, and as it was being sold on the open market, the farmers would receive the full world's value for their product. Any surplus from this crop over and above the cost of treatment would be returned to the growers.

"The Minister has received information from the Commonwealth Flax Committee to the effect that further satisfactory sales of fibre have been made, and that the committee hopes to be able in a short time to declare a further substantial dividend on the flax crop of 1918, the growers having been paid already £7 a ton."

We ("Q.A.J.") have frequently advocated the cultivation of flax as a payable proposition. We have also conclusively shown, by the published results of this industry in the Southern States, that the climate and soils of Queensland are able to fulfil all the conditions needed for successful flax culture and for the production of linseed. In the issue of this Journal for July, 1919, will be found a paper by Mr. H. A. Strain, of Terror's Creek, who has had a life-long experience in all branches of the business, both in the field and in the factory, on this subject, and in the September number of the same year we received from the Department of Agriculture, Nairobi, British East Africa, a very informative pamphlet on flaxgrowing, and its preparation for market, by Mr. Hugh Simpson, Flax Instructor, entitled "Hints on Flax Culture," and "Flax as a Fibre Plant." The pamphlet deals with such subjects as soils suitable for the crop, rotation of flax, selection of seed, sowing, weeding, "pulling," threshing out the seed, watering or retting to decompose the vegetable matter connecting the stem and fibre; spreading, lifting, and breaking the dry stems; scutching, hackling, and treatment of the tow. Subsequently we received a report giving particulars of the returns from a flax crop grown at Emerald, on the Fern Tree Gully, 30 miles from Melbourne. From this report it may be judged how a flax crop would pay in Southern Queensland. This crop, on 90 acres, yielded to the grower a gross result of £119 per acre. He cut from the above area 2,500 tons of green leaf, which yielded 300 tons of fibre. As the value of the fibre was then (November, 1919) £33 per ton, the gross return per acre was, as stated, £110.

From various sources we understand that the net profit on the seed alone is set down at £8 10s., and of the fibre £7, which would make the profit amount to £15 10s. per acre. Since that was written, however, not only wages but many other adjuncts to the production of flax, fibre, and linseed, have risen in cost, and we must await the balance-sheet of any present flaxgrower to arrive at a correct estimate of production, cost of marketing, &c.

PIG-FATTENING EXPERIMENTS WITH DRIED BLOOD.

Apropos of our notes lately published on the effect of feeding dried blood to pigs, particularly the successful experiment recorded by a Beerwah farmer, we find, in the November number of the "Agricultural Gazette," of 2nd November, 1920, the following notes of experiments made in England by the Food Investigation Board and the Ministry of Agriculture, with a view to determining the value and

safety of dried blood as a nitrogen-supplying portion of a fattening animal's ration. Results of previous trials with dried blood had indicated its food-value when added to a mixed diet, and this experiment was restricted to the effect of blood as an addition to a carbo-hydrate diet:—

"Twenty-eight pigs were selected and divided into four lots of seven pigs each; each lot being arranged to average, as nearly as possible, the same total live weight, and to include two 'large white,' one 'large black,' and four cross-bred pigs. The four pens of seven pigs were fed as follows:—Lot 1, wheat offals only; Lot 2, maizemeal only; Lot 3, wheat offals and dried blood; Lot 4, maizemeal and dried blood. In addition, each pig received ½ oz. bonemeal daily.

"The amount of blood fed to each pig in Lots 3 and 4 was 2 oz. per day to begin with, rising gradually to 6oz., an average of 4 oz. per day. It took two or three days before the pigs tolerated the blood, but they eventually took it willingly.

"The pigs were weighed at weekly intervals, and after eleven weeks' feeding made a gain of 268 lb. in Lot 1, 283 lb. in Lot 3, and 207 lb. in Lot 4, and a loss of 3 lb. in Lot 2. The pigs in Lot 2 showed very little appetite, and after a week or two took their ration of plain maizemeal with reluctance, and only when pressed by hunger. The results obtained indicated that the addition of blood to an ordinary farm ration of wheat offals may cause a very considerable gain in weight, compared with the results obtained from a farm diet of offals only, while the addition of blood to plain maizemeal may give an increase equal to the results obtained from feeding offals only."

COST OF SUGAR-GROWING AND SUGAR MANUFACTURE IN 1892 AND 1920.

The late Mr. S. Grimes, M.L.A., writing, in 1892, to a Brisbane newspaper on this subject, to correct the figures given in a report of a speech by him at Corinda, gave the following statement as correct:—Cost of cultivation, £3 per ton of sugar, or £4 10s. per acre; cutting cane, at 2s. per ton, £2; cartage of cane, 18s. 8d. per ton; manufacturing, £2 8s.; bags and freight, 15s. 11d.; interest on capital, £2 9s. 6d.; depreciation, 5 per cent. on machinery, £1; making a total cost of £12 11s. 2d., which, at the then price of sugar—namely, £15 per ton, gave a margin of profit of £2 8s. as the result of the employment of European labour.

Since that time conditions in connection with the sugar industry have changed in almost every particular, especially in the items of labour, improved machinery, &c. Taking the cost of cultivation: This amounts approximately to £18 per acre, in the case of ploughed land, and to still more on newly-felled or unstumped scrub land. The cost of cutting cane in the South may be set down at 7s. 6d. per ton, in the Central district at 7s. 9d., and in the Northern section at 8s., where the crop runs to 15 tons and over per acre. The transport of cane by wagons for distances up to 2 miles, averages 2s. 8d. per ton. Beyond that distance a special rate is provided for. When, however, the cane is hauled over portable tramlines to a permanent line, the charge is reduced to 1s. 6d. per ton. The mill then takes delivery and hauls the cane free gratis for the grower.

The cost of manufacturing for the season 1917-18 amounted at Babinda in the North to £2 2s. 10d. per ton, including all charges, as well as depreciation. The present price of raw sugar is £30 6s. 8d. per ton.

THE AMERICAN COTTON SITUATION.

The wave of depression caused by the apathy of the distributing markets in yarn and cloth continues unchecked. The weakness displayed by the cotton markets this week is largely due to the attitude of the South by reason of the world's lack of interest in the raw material, with a consequence that values have now declined to a point materially below the cost of production, which the Texas State Department of Agriculture estimates as high as 46 cents per lb. The low level cannot be

justified, having regard to the present tendency to reduce crop estimates, the reports of damage to grade by reason of heavy rains, and that the world's mills are not in a position, owing to reduced working hours and idle spindles, to meet a normal demand. The present enforced curtailment of production by reason of buyers hesitating to place business must accentuate the difficulty in meeting the world's requirements. It seems logical to reason that business must eventually be placed, and that demand for the manufactured article will again be an important factor in influencing the cotton markets.

Advices invariably refer to a lowering of the condition of the crop. The "Memphis Commercial Appeal" forecasts a yield of 12,600,000 bales, and the Southern Products Company of 11,640,000.

The "New York Journal of Commerce," in its monthly review of the crop outlook, reports deterioration, and that generally there is no promise of a top crop. Nevertheless, these reports are ignored by the markets.

The following are the official "Spot" prices in Liverpool yesterday, and on the corresponding dates in 1919, 1918, and 1917:—

—	1920.	1920. *Last Week.*	1919.	1918.	1917.
"Middling" American	19·17	*21·35*	19·32	23.90	18·62N
"Good Middling" American ..	22·67	*24·85*	20·52	24·53	19·07
"Fair" Pernam..	21·42N	*23·35N*	22·22N	29·86N	20·60N
"F.G.F. Sakel," Egyptian ..	54·00	*57·00*	30·00	29·40	31·35
"Fine" Broach	16·35N	*17·60N*	18.20N	24·50N	18·70N
"Fine" No. 1 Oomra	14·85N	*15·35N*	16·95N	22·75N	17·50N
"Fine" Bengal	9·25N	*9·50N*	14·85N	20·25N	16·00N

AVERAGE WEEKLY CONSUMPTION OF GREAT BRITAIN DURING TWELVE MONTHS.

SEASONS ENDED 31ST JULY.

Season.	American.	Egyptian.	Total.
1914-15	61,720	6,010	74,810
1915-16	62,140	6,980	76,280
1916-17	55,700	6,780	68,600
1917-18	44,250	6,760	56,930
1918-19	41,020	9,920	55,270

Answers to Correspondents.

THE USE OF BLUESTONE ON BLOWN SHEEP.

W. LAMB, Pine Vale, Dagmar.—

Replying to your question, Mr. W. G. Brown, sheep and wool expert of the Department of Agriculture and Stock, advises 2 lb. bluestone to 4 gallons of water, or in similar proportions for larger or smaller quantities.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR NOVEMBER, 1920.

Article.		NOVEMBER. Prices.
Bacon	lb.	1s. 5d.
Bran	ton	£9 5s.
Broom Millet	"	£36
Broom Millet (Sydney)	"	£45 to £50
Butter (First Grade)	cwt.	238s.
Chaff, Lucerne	ton	£7 10s.
Chaff, Mixed	"	£5 to £7
Chaff, Oaten	"	£12
Chaff, Wheaten	"	£7
Chaff, Panicum	"	...
Cheese	lb.	1s. 2d.
Flour	ton	£19 10s.
Hams	lb.	1s. 11d. to 2s. 2d.
Hay, Lucerne	ton	£5 to £5 10s.
Hay, Oaten	"	...
Honey	lb.	6½d. to 7½d.
Maize	bush.	6s. 10d. to 7s.
Oats	"	6s.
Onions	ton	£8 to £18 10s.
Peanuts	lb.	6d. to 7d.
Pollard	ton	£10
Potatoes (English)	"	£8 9s. to £9 15s
Potatoes (Sweet)	cwt.	4s. 3d. to 5s.
Pumpkins (Cattle)	ton	£3 10s. to £6 10s.
Eggs	doz.	1s. 5d. to 1s. 6d.
Fowls	per pair	7s. 6d. to 12s. 6d.
Ducks, English	"	5s. 6d. to 6s. 5d.
Ducks, Muscovy	"	7s. 6d. to 10s. 6d.
Geese	"	10s. to 12s.
Turkeys (Hens)	"	12s. 6d. to 12s. 9d.
Turkeys (Gobblers)	"	25s. to 35s.
Turnips (Swede)	cwt.	1s. 3d. to 1s. 9d.
Wheat	bush.	9s.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per dozen bundles	7s. to 10s.
Beans, per sugar bag	2s. 6d. to 4s.
Beetroot, per dozen bunches	6d. to 9d.
Cabbages, per dozen	1s. to 2s. 6d.
Carrots, per dozen bunches	1s. to 2s.
Cauliflowers, per dozen	...
Cucumbers, per dozen	6d. to 2s.
Lettuce, per dozen	2d. to 6d.
Marrows, per dozen	1s. to 3s.
Peas, per sugar bag	7s. to 9s.
Potatoes (Sweet), per sugar bag	3s. to 4s. 9d.
Pumpkins (table), per dozen	4s. to 9s.
Tomatoes, per quarter case	6s. to 9s.
Turnips (Swede), per cwt.	1s. 2d. to 1s. 9d

SOUTHERN FRUIT MARKETS.

Article.	NOVEMBER. Prices.
Bananas (Tweed River), per double case	30s. to 33s.
Bananas (Queensland), per double case	26s. to 35s.
Bananas (Fiji), per double case	...
Cucumbers (Queensland), per case	16s. to 20s.
Lemons, per bushel case	6s. to 8s.
Mandarins, per case	12s. to 20s.
Oranges (common), per bushel case	10s. to 13s. 6d.
Oranges (Navel), per bushel case	12s. to 20s.
Passion Fruit, per bushel case	14s. to 20s.
Pineapples (Queens), per double case	16s. to 21s.
Pineapples (Ripley), per double case	18s. to 22s.
Pineapples (common), per double case	5s. to 8s.
Tomatoes (Queensland), per ½-case	15s. to 30s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per half bushel case	13s. to 17s.
Apples, Cooking, per bushel case	11s. to 14s.
Bananas (Cavendish), per dozen	8d. to 10½d.
Bananas (Sugar), per dozen	5d. to 9d.
Cape Gooseberries, per quart	10d. to 11d.
Citrons, per cwt.	16s.
Cocoanuts, per sack	£1 5s.
Cumquats, per quarter case	4s. to 5s. 6d.
Custard Apples, per case	3s. to 6s.
Lemons (Lisbon), per quarter case	4s. to 9s.
Mandarins (special), per case	14s. to 18s. 6d.
Oranges (Seville), per cwt.	16s.
Oranges (special), per case	14s. to 16s. 6d.
Oranges (second crop), per case	3s. to 6s. 6d.
Papaw Apples, per quarter tray	2s. 6d. to 6s. 6d.
Passion Fruit, per half bushel case	12s. to 14s. 6d.
Peaches, per half bushel case	5s. to 10s.
Pineapples (smooth), per case	7s. to 10s.
Pineapples (rough), per case	9s. 6d. to 12s.
Strawberries, per dozen boxes	5s. to 10s.
Tomatoes, per quarter case	14s. to 17s.

TOP PRICES, ENOGGERA YARDS, OCTOBER, 1920.

Animal.	OCTOBER. Prices.
Bullocks	£25 to £30 15s.
Cows	£18 17s. 6d. to £20
Merino Wethers	49s.
Crossbred Wethers	40s.
Merino Ewes	29s. 6d.
Crossbred Ewes	35s. 6d.
Lambs	37s.
Pigs (Porkers)	68s. 6d.

Orchard Notes for January.

THE SOUTHERN COAST DISTRICTS.

The fruit of the month in this part of the State is the grape, and its gathering and marketing will occupy the attention of growers. Care should be taken to cut the fruit when cool and dry, and if it has to be sent any distance the stems of the bunches should be allowed to wilt before the fruit is packed, as the berries will then hang on to the bunch better, and the bunch carry in better order. Select the fruit carefully, grade it, and pack firmly so that it will not bruise in transit. If to be sent long distances, pack in crates holding from four to six 6-lb. basktes. Pines will be ripening in quantity towards the end of the month. Gather before fully coloured, and, whether for Southern or local markets, pack and handle carefully to prevent bruising. Do not ship the fruit too green for the Southern markets, as doing so is apt to spoil the trade. Send good fruit to the canneries. Small pines and crippled fruit are no good to canners, and the sooner our growers realise that it only pays to grow good fruit the better for them and for the canners, for if the latter cannot get good fruit, it is impossible for them to put a line of goods on the market that will not only be a credit to the State, but for which a world-wide market can be obtained.

Passion fruit should not be allowed to lie about for days on the ground before gathering, as, if so, they are apt to become fly-infested.

Watermelons and rockmelons are still in season.

Watch any late peaches, Japanese plums, or other fruits liable to be infested with fruit-fly, and gather and destroy all infested fruit, or, better still, grub the trees out and burn them, as they only breed flies to destroy more valuable fruit. Mangoes will be ripening during the month. See that all fly-infested fruits are destroyed, as they will only breed up further crops to destroy later ripening fruits.

Citrus orchards can be cyanided during the month for scale insects, and spraying for Maori with the sulphide of soda wash should be continued where necessary.

Mangoes can be budded during the month, as well as citrus and deciduous trees. Tropical fruit trees can be transplanted, taking care to choose dull weather and to cover same from the direct rays of the sun till they have become firmly established. Pines and bananas can still be planted.

THE TROPICAL COAST DISTRICTS.

Mangoes will be going off. See that they are not allowed to remain about on the ground to breed flies for the autumn crop of oranges. Longan, litchi, and other fruit are in season. As the month is often a very wet one, little cultivation can be done in the orchards. Strong undergrowth should, however, be kept down with a hoe or scythe. Tropical fruits of all sorts can be planted. Look out for Maori on citrus fruits, and spray when necessary.

THE SOUTHERN AND CENTRAL TABLELANDS.

January is a busy month in the Stanthorpe district, apples, pears, plums, peaches, and nectarines being in season. Do not gather the fruit too immature; at the same time, don't allow it to be over-ripe. Gather dry, handle carefully, grade and pack in attractive cases. Keep the fruit as cool as possible, and ship in well-ventilated cars. Keep a sharp lookout for fruitfly, and take every possible means to prevent its spreading, even going as far as to gather and destroy the whole of the fruit on

any infected trees, for if kept in check during the month, the bulk of the fruit ripening during February will be free.

Keep a sharp lookout also for codling moth; examine the bandages on the trees at least every ten days, and destroy all larvæ found therein; also gather and destroy all moth-infected fruit.

Gather Bartlett pears as soon as they are large enough, and store away in a cool shed to ripen; when they show signs of ripening, market, not before. If sent down green they will sell for cooking, and only fetch a small price. The right stage at which to gather is when the fruit is fully developed, and the flesh has lost its woody flavour, but is still quite hard. This is usually before the fly has stung it, and if gathered at this stage the fruit will ripen up properly without shrivelling, and develop its full flavour.

These remarks apply also to the Downs country, which is somewhat earlier than Stanthorpe.

The crop of the month in the Western tablelands is the grape; and the remarks I have made respecting this fruit when grown in the Southern Coast districts apply equally here. The fruit should be gathered dry, and wilted before it is packed. Too large cases are often used; cases holding from 20 to 30 lb., or crates holding six 6-lb. baskets, are preferable, the latter being the best package for shipping the fruit long distances. Keep the orchards well cultivated, and, where water for irrigation is available, give citrus trees a watering during the month, unless there has been a sufficient rainfall. When the orchard is irrigated, see that thorough cultivation follows the irrigation, so as to conserve the moisture in the soil.

Red scale, which is prevalent on citrus trees in the dry Western country, should be treated during the month. Cyaniding is the best remedy.

Farm and Garden Notes for January.

FIELD.—The main business of the field during this month will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean. Great care must be exercised in the selection of seed potatoes to ensure their not being affected by the Irish blight. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye, and cowpeas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole. Early-sown cotton will be in bloom.

KITCHEN GARDEN.—A first sowing of cabbages, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow shallow drills; they will thus grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering. Give the beds a good soaking every evening. Mulcing and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw,

grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather, sow French beans, cress, cauliflower, mustard, cabbage, celery, radish for autumn and winter use. Sow celery in shallow well-drained boxes or in small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter are, however, unlikely to succeed except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

FLOWER GARDEN.—To make the flower-beds gay and attractive during the autumn and winter months is not a matter of great difficulty. Prepare a few shallow boxes. Make a compost, a great part of which should consist of rotten leaves. Fill the boxes with the compost; then sow thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle lift them gently one by one with a knife or a zinc label—*never pull them up by hand*, as, by so doing, the tender rootlets are broken, and little soil will adhere to the roots. Prick them out into beds or boxes or very little soil containing plenty of leaf mould. Then keep a sharp lookout for slugs and caterpillars. Keep a supply of tobacco dust on hand, and scatter this in the path of the slug, and he will cease from troubling you.

All kinds of shrubbery plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to over-water at this season. Propagate verbenas, not forgetting to include the large scarlet Fox-hunter. Verbenas require rich soil. Palms may be planted out this month. If the weather prove dry, shade all trees planted out. With seed boxes, mulch, shade, water, and kerosene spray, all of which imply a certain amount of morning and evening work, the flower garden in autumn and winter will present a charming sight, and will afford light and profitable work for girls with spare time on their hands.

An exhaustive booklet on "Flower Gardening for Amateurs" has been issued by the Department of Agriculture and Stock, and may be obtained from the Office. Price, 2s.

Another useful publication is "Market Gardening in Queensland." Price, 1s., also issued by the Department.

SEED TESTING.

Samples of any seeds purchased or offered for sale as seeds for sowing may be sent to the Department of Agriculture and Stock for examination.

WEIGHT OF SAMPLE TO MAIL.

Wheat, Oats, Barley, Maize, Rice, Rye, Peas, Cowpeas, Beans, Tares	8 oz.
Millet, Sorghum, Sudan Grass, Panicum, Buckwheat, Lucerne, Clover, Linseed	4 oz.
Rhodes, Paspalum	2 oz.
Turnip, Cabbage, Parsnip, Carrot, and Vegetable Seeds of like size	½ oz.
All Seeds other than those included above	2 oz.
Vegetable Seeds in made-up packets	3 packets

In the case of samples containing a large amount of Foreign Ingredients, it is advisable to send double the weight mentioned.

When drawing a sample be careful to obtain a quantity from the top, bottom, and middle of each bag. These should be thoroughly mixed to ensure the sample being uniform.

The name of the seed, quantity that the sample represents, also name and full address of the sender, should be on every sample.

If the result of the examination is required for purposes of sale, a fee of 2s. 6d. per sample will be charged.

No charge will be made to Farmers sending in samples of seed which they have purchased as seed for sowing, providing the following particulars are given:—

Vendor's name and address.

Name of seed.

Quantity purchased.

Date of delivery.

Locality where seed is to be sown.

Name and address of purchaser.

Samples, with covering letter, should be addressed to—

UNDER SECRETARY,
DEPARTMENT OF AGRICULTURE AND STOCK,
BRISBANE.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.
AT BRISBANE.

1921.	JANUARY.		FEBRUARY.		MARCH.		APRIL.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	4·57	6·45	5·22	6·42	5·41	6·20	5·58	5·46
2	4·58	6·45	5·22	6·41	5·41	6·19	5·58	5·45
3	4·59	6·45	5·23	6·41	5·42	6·18	5·59	5·44
4	4·59	6·46	5·24	6·40	5·43	6·17	5·59	5·43
5	5·0	6·46	5·24	6·40	5·43	6·16	6·0	5·42
6	5·1	6·46	5·25	6·39	5·44	6·15	6·0	5·41
7	5·2	6·47	5·26	6·38	5·45	6·14	6·1	5·40
8	5·2	6·47	5·27	6·38	5·45	6·13	6·1	5·39
9	5·3	6·47	5·27	6·37	5·46	6·12	6·2	5·38
10	5·4	6·47	5·28	6·36	5·46	6·10	6·2	5·37
11	5·5	6·47	5·29	6·36	5·47	6·9	6·3	5·35
12	5·5	6·47	5·30	6·35	5·47	6·8	6·3	5·34
13	5·6	6·47	5·30	6·34	5·48	6·7	6·4	5·33
14	5·7	6·47	5·31	6·33	5·48	6·6	6·4	5·32
15	5·8	6·47	5·32	6·33	5·49	6·5	6·5	5·31
16	5·9	6·47	5·32	6·32	5·49	6·4	6·5	5·30
17	5·9	6·47	5·33	6·31	5·50	6·3	6·6	5·30
18	5·10	6·47	5·34	6·30	5·50	6·2	6·6	5·29
19	5·11	6·47	5·34	6·30	5·51	6·1	6·7	5·28
20	5·12	6·46	5·35	6·29	5·51	6·0	6·7	5·27
21	5·12	6·46	5·36	6·28	5·52	5·59	6·8	5·26
22	5·13	6·46	5·36	6·27	5·52	5·58	6·8	5·25
23	5·14	6·45	5·37	6·26	5·53	5·57	6·9	5·24
24	5·15	6·45	5·38	6·25	5·53	5·56	6·9	5·23
25	5·15	6·45	5·38	6·24	5 54	5·55	6·10	5·22
26	5·16	6·44	5·39	6·23	5·54	5·53	6·10	5·21
27	5·17	6·44	5·40	6·22	5·55	5·52	6·11	5·20
28	5·18	6·44	5·40	6·21	5 55	5·51	6·11	5·20
29	5·19	6·43	...	...	5·56	5·50	6·12	5·19
30	5·20	6·43	...	...	5·56	5·49	6·12	5·18
31	5·21	6·43	...	...	5·57	5·48	...	...

PHASES OF THE MOON, ECLIPSES, &c.

(The times stated are for Queensland, New South Wales, and Victoria, where the clock time is identical).

		H.	M.
9 Jan.	● New Moon	3	27 p.m.
17 „	☾ First Quarter	4	31 p.m.
24 „	○ Full Moon	9	8 a.m.
31 „	☽ Last Quarter	6	2 a.m.

Apogee on 9th. Perigee on 23rd.

8 Feb.	● New Moon	10	37 p.m.
16 „	☾ First Quarter	4	53 a.m.
22 „	○ Full Moon	7	33 p.m.

Apogee on 5th. Perigee on 21st.

1 Mar.	☽ Last Quarter	abt.	m'night
10 „	● New Moon	4	9 a.m.
17 „	☾ First Quarter	1	49 p.m.
24 „	○ Full Moon	6	19 a.m.
31 „	☽ Last Quarter	7	13 p.m.

Apogee on 5th. Perigee 21st.

8 Apr.	● New Moon	7	5 p.m.
15 „	☾ First Quarter	8	12 p.m.
22 „	○ Full Moon	5	50 p.m.
30 „	☽ Last Quarter	2	9 p.m.

Apogee on 2nd and 30th. Perigee on 17th at 3 p.m.

ECLIPSES.

An Annular Eclipse of the Sun visible in North of Scotland but not in Australia will occur on April 8th.

An Eclipse of the Moon will occur on April 22nd, when the Moon will rise totally eclipsed.

The Planets Venus, Mars, and Uranus will be remarkably close together apparently on January 9th, and will form a fine celestial picture with the Moon on the 13th.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise about 4 minutes later than at Brisbane if it were not for its higher elevation, and at Oontoo (longitude 141 degrees E.) about 48 minutes later.

At St. George, Cunnamulla, and Thargomindah the times of sunrise and sunset will be about 18 m., 30 m., and 38 minutes respectively, later than at Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

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